11-5805-707-34

ARMY TM 11-5805-707-34
NAVY EE163-EE-MMI-010/E154 TD1234
AIR FORCE TO 31W2-2TTC-22
MARINE CORPS TM 08792A-34/2

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

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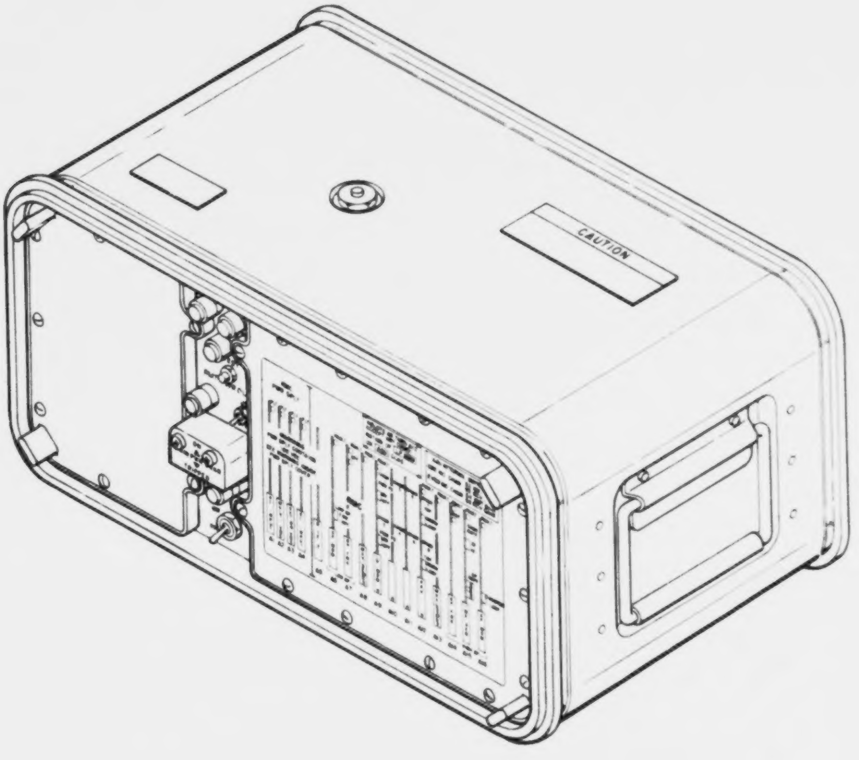

MULTIPLEXER-COMBINER

TD-1234(P)/TTC

(NSN 5820-01-145-2458)

DEPARTMENTS OF THE ARMY, THE NAVY, AND
THE AIR FORCE

16 SEPTEMBER 1985

READEX FICHE best copy available

D 101. 11:

⑤ SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

① DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

② IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

③ IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

④ SEND FOR HELP AS SOON AS POSSIBLE

⑤ AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

WARNING

HIGH VOLTAGE

The high voltage used in this equipment can kill on contact. Observe the following safety precautions:

• **Ground the Equipment**	Before connecting primary power or the signal cables, connect a heavy gage copper wire from the ground lug on the rear panel to earth ground. Do not remove this wire until the signal cables and primary power have been disconnected.
• **Avoid the Power Input**	Be careful not to contact the 115-volt ac input connections when installing or servicing the equipment.
• **Do Not Service Alone**	Never work on the equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who can administer first aid.
• **Use One Hand**	Where possible, use only one hand to service the equipment. Keep the other hand away to reduce the hazard of current flowing through the vital organs of the body.

WARNING

CLEANING SOLVENT

The fumes of trichlorotrifluoroethane used for cleaning this equipment can cause severe irritation or injury. Observe the following safety precautions:

• **Ventilate**	Use only outside or in well ventilated areas and avoid breathing the fumes.
• **No Smoking**	Do not smoke while using and do not use near an open flame or hot surface. Trichlorotrifluoroethane does not burn but heat converts the fumes to a toxic, irritating gas.
• **Use Gloves**	Use gloves that trichlorotrifluoroethane can't penetrate. Because the solvent dissolves the natural oils, avoid long or repeated contact with your skin.
• **Wash**	Wash hands immediately after using.
• **Do Not Take Internally**	Do not drink. If taken internally, see a doctor immediately.

WARNING

HEAVY EQUIPMENT

This equipment weighs over 35 pounds and can cause serious injury if lifted or carried alone. Observe the following safety precaution:

• **Do Not Lift or Carry Alone**	Do not attempt to lift, carry, or move the equipment by yourself — get help.

INSERT LATEST CHANGED PAGES, DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

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DATES OF ISSUE for original and changed pages are:

Original..0...1 December 1984

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EE163-EE-MMI-010/E154 TD1234
TO 31W2-2TTC-22
TM 08792A-34/2

Technical Manual
No. 11-5805-707-34
Technical Manual
EE163-EE-MMI-010/E154 TD1234
Technical Order
No. 31W2-2TTC-22
Technical Manual
No. 08792A-34/2

DEPARTMENTS OF THE ARMY,
THE NAVY, AND
THE AIR FORCE, AND
HEADQUARTERS MARINE CORPS

Washington, DC, 16 September 1985

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL
MULTIPLEXER COMBINER TD-1234(P)/TTC
(NSN 5820-01-145-2458)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, TO 00-5-1. Forward direct to prime ALC/MST.

For Navy, mail comments to the Commander, Naval Electronics System Command, ATTN: ELEX 8122, Washington, DC 20360.

For Marine Corps, submit NAVMC 10772 (Recommended Change to Technical Publications) to Commanding General, Marine Corps Logistics Base (Code 850), Albany, Georgia 31704.

In any case, a reply will be furnished direct to you.

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HOW TO USE THIS MANUAL

This manual tells you how to operate and maintain Multiplexer-Combiner TD-1234(P)/TTC.

Step-by-step procedures with illustrations give you all the necessary information to maintain this equipment at the direct support level. However, do not attempt any procedure before you first familiarize yourself with the entire procedure.

If you are looking for general information, use the table of contents in the front of this book to locate chapters and sections containing this information.

If you are looking for specific information, use the subject index in front of each chapter to locate the paragraph and page where the topic is discussed.

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INTRODUCTION

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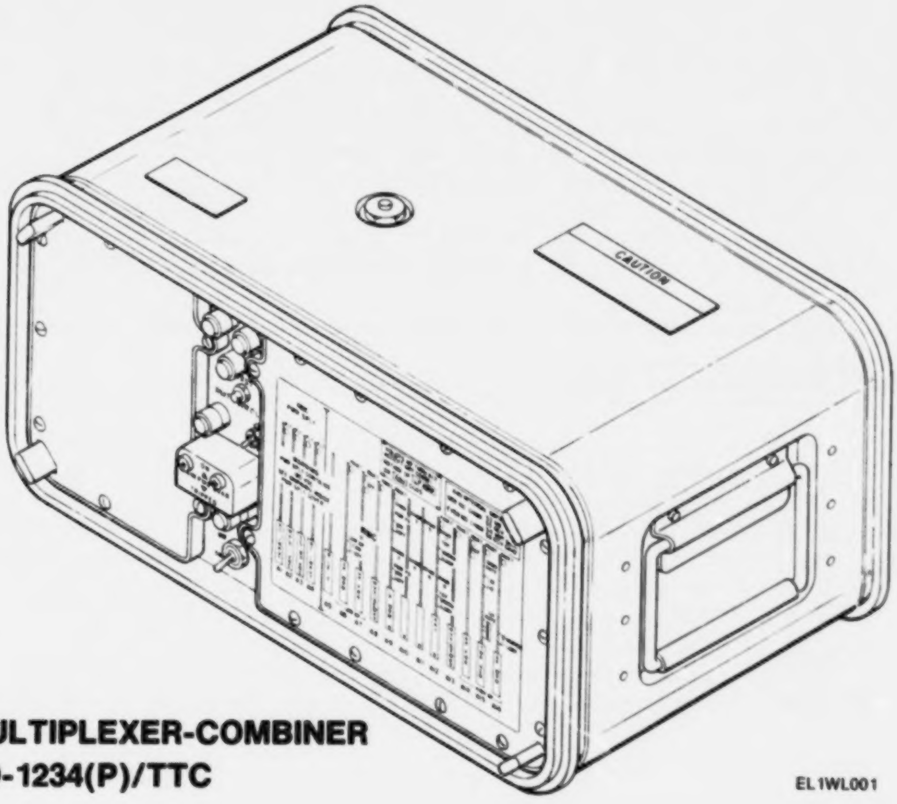
SECTION I. GENERAL INFORMATION



MULTIPLEXER-COMBINER
TD-1234(P)/TTC

1-1. SCOPE

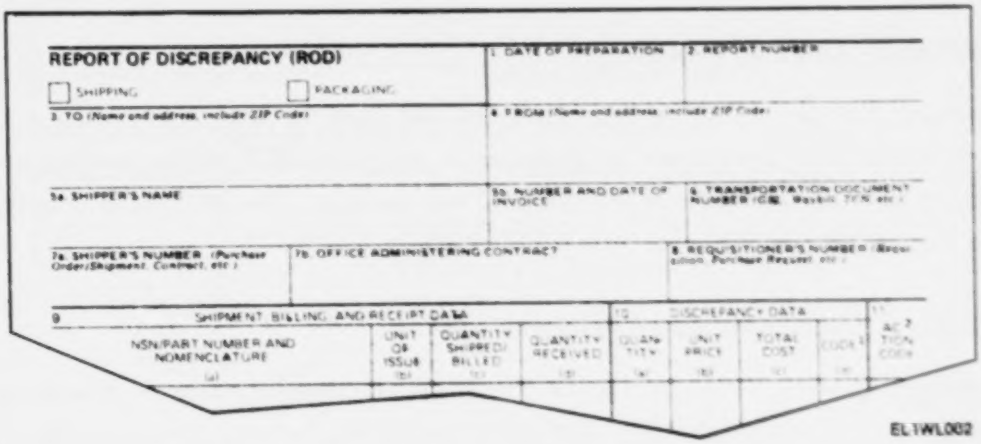
This manual provides direct support and general support maintenance instructions for Multiplexer-Combiner TD-1234(P)/TTC. Multiplexer-Combiner TD-1234(P)/TTC is referred to in this manual as the RMC (Remote Multiplexer-Combiner).

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update. Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS—Continued

the Maintenance Data Collection Subsystem (MDCS) in accordance with OPNAVINST 4790.2, Volume 3, and unsatisfactory material conditions (UR submissions) in accordance with OPNAVINST 4790, Volume 2, Chapter 17.



REPORT OF DISCREPANCY (ROD)

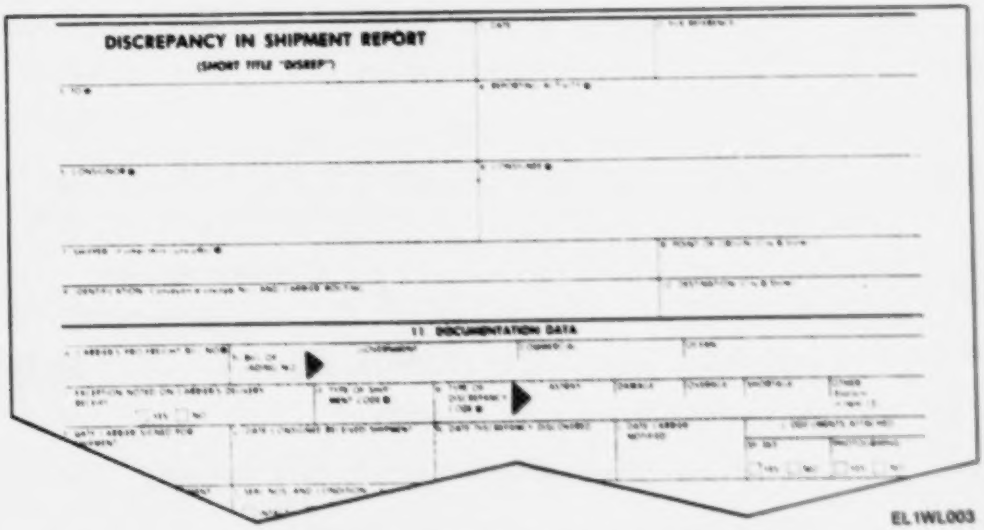
☐ SHIPPING ☐ PACKAGING

1. DATE OF PREPARATION
2. REPORT NUMBER
3. TO (Name and address, include ZIP Code)
4. FROM (Name and address, include ZIP Code)
5a. SHIPPER'S NAME
5b. NUMBER AND DATE OF INVOICE
6. TRANSPORTATION DOCUMENT NUMBER (GBL, Waybill, TCN, etc.)
7a. SHIPPER'S NUMBER (Purchase Order/Shipment, Contract, etc.)
7b. OFFICE ADMINISTERING CONTRACT
8. REQUISITIONER'S NUMBER (Requisition, Purchase Request, etc.)

9 SHIPMENT, BILLING, AND RECEIPT DATA				10 DISCREPANCY DATA				11
NSN/PART NUMBER AND NOMENCLATURE (a)	UNIT OF ISSUE (b)	QUANTITY SHIPPED/BILLED (c)	QUANTITY RECEIVED (d)	QUANTITY (a)	UNIT PRICE (b)	TOTAL COST (c)	CODE¹ (d)	ACTION CODE²

EL1WL002

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy) (ROD) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.



DISCREPANCY IN SHIPMENT REPORT

(SHORT TITLE "DISREP")

11 DOCUMENTATION DATA

EL1WL003

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2, Procedures for Destruction of Electronic Materiel to Prevent Enemy Use.

1-4. ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness.

1-5. NOMENCLATURE CROSS-REFERENCE LIST

The following list will help you locate the official nomenclature of the major equipment associated with the RMC. Official nomenclature must be used when completing report forms or when using technical manuals.

Common Name	Official Nomenclature	Reference Designation
AAU	Analog Applique Unit Circuit Card Assembly	A9-A12*
AC INPUT	Ac Input Circuit Card Assembly	A1
BITE 2	BITE 2 Circuit Card Assembly	A5
DC INPUT	Dc Input Circuit Card Assembly	A4
GP FRG	Group Framing Circuit Card Assembly	A7,A14
GP MDM	Group Modem Circuit Card Assembly	A6,A16
LP MDM	Loop Modem Circuit Card Assembly	A9-A12*
MULTI VDC	Multi Vdc Circuit Card Assembly	A2
MUX/DEMUX	Multiplexer/Demultiplexer Circuit Card Assembly	A8,A13
TMG GEN	Timing Generator Circuit Card Assembly	A15
52/180 VDC	52/180 Vdc Circuit Card Assembly	A3

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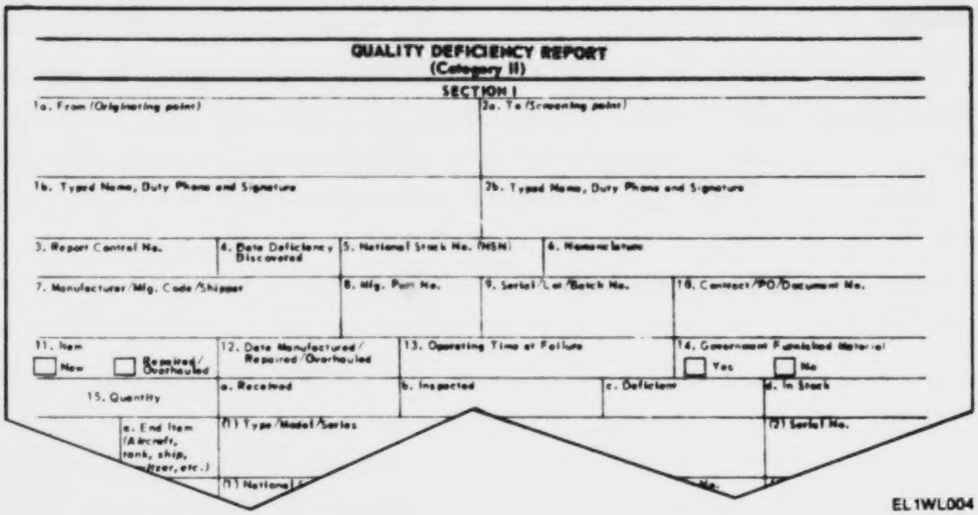
* The RMC can be configured with any combination of AAU or LP MDM CCAs in slots A9 through A12.

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS)



QUALITY DEFICIENCY REPORT
(Category II)
SECTION I

1a. From (Originating point)
2a. To (Screening point)
1b. Typed Name, Duty Phone and Signature
2b. Typed Name, Duty Phone and Signature
3. Report Control No.
4. Date Deficiency Discovered
5. National Stock No. (NSN)
6. Nomenclature
7. Manufacturer/Mfg. Code/Shipper
8. Mfg. Part No.
9. Serial/Lot/Batch No.
10. Contract/PO/Document No.
11. Item ☐ New ☐ Repaired/Overhauled
12. Date Manufactured/Repaired/Overhauled
13. Operating Time at Failure
14. Government Furnished Material ☐ Yes ☐ No
15. Quantity a. Received b. Inspected c. Deficient d. In Stock
e. End Item (Aircraft, tank, ship, ...itzer, etc.) (1) Type/Model/Series (2) Serial No.

EL1WL004

a. Army. If your Multiplexer-Combiner TD-1234(P)/TTC needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIRs in accordance with AFR 900-14.

c. Navy. Navy personnel are encouraged to submit EIRs through their local Beneficial Suggestion Program.

d. Marine Corps. Marine Corps Units shall submit NAVMC10772.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

See TM 11-5805-707-12 for RMC equipment description and data.

SECTION III. PRINCIPLES OF OPERATION

1-7. GENERAL

Refer to TM 11-5805-707-12 for a simplified functional description of the remote multiplexer-combiner (RMC). This section contains a detailed functional description of the RMC and detailed descriptions of the functions of each of the circuit card assemblies (CCAs) within the RMC.

1-8. RMC FUNCTIONAL DESCRIPTION (fig. FO-1)

The RMC time-division-multiplexes up to eight digital loop channels and a low side group into a single high side group. It also demultiplexes a digital group into separate digital group loop groups. A separate channel is used for overhead (non-traffic) functions such as framing pattern and telemetry. On the loop side, the unit contains eight loop modem channels or eight analog channels to interface with and provide dc power to digital voice terminals (secure or non-secure) over field wire, or to interface with analog telephones. An analog voice orderwire (AVOW) facility is provided on both group sides for full duplex voice communication during maintenance. The unit contains a fault-locating built-in test equipment (BITE) capability. It also provides a unit alarm output, available for system status/control interface.

The high side group input and output interfaces with CX-11230 cable to transmit and receive conditioned diphase group data to DGM equipment over cable lengths up to 2 miles. AVOW is superimposed over the data on the cable for local use during set-up and test. The group data consists of a variable number of channels of digital data and an overhead channel composed of eight multiplexed subchannels. Subchannel 0 is used for aligning the multiplexed/demultiplexed group data stream. Subchannel 7 is used for operating normal/fault status on a go/no-go basis of the equipment. Use of subchannels 5 and 6 depends on how the RMC is interconnected. The other subchannels are not used. High side incoming group data is processed by a group modem CCA which converts the conditioned diphase data to NRZ, and derives a clock from the bit rate. The nonreturn to zero (NRZ) data bits are passed to a mux/demux and a framing CCA. The recovered clock is passed to the timing generator. The timing

1-8. RMC FUNCTIONAL DESCRIPTION—Continued

generator provides the timing signals necessary to control framing and synchronization. The timing signals are derived through use of an internal oscillator which either locks to the incoming group timing signal (recovered clock) or acts as master timing. A toggle switch located on the high group modem CCA is used to select this function. The low group toggle switch is used in programming the mux/demux CCA. The framing CCA accomplishes two primary functions: framing and synchronization. Framing is implemented primarily by counters which monitor the incoming data to detect errors in the framing patterns. Synchronization interprets the frame status information and provides controls for the receive/transmit data and frame output pattern. The mux/demux receives retimed (reframed) group data and a frame reference from the framing CCA. It demultiplexes the data into the channels and subchannels. From the mux/demux some of the data passes to the loop modem which modulates the NRZ data received from the mux/demux to conditioned diphase. It then transmits these to the digital secure voice terminals (DSVT). Optionally, it can be sent to an AAU for conversion to analog. Conversely, the loop modem receives conditioned diphase data from the DSVTs and converts each of these DSVT channels to NRZ data. These now pass to the mux/demux for framing. They then pass to the group modem where the data is remodulated to conditioned diphase for transmission over a CX-11230 cable.

Group data can also enter the RMC from the low side cable interface and, as described earlier for the high side, AVOW entering through the low side interface is superimposed over the data bit stream at the group modem CCA. The RMC utilizes two identical mux/demux CCAs and two identical group framing CCAs. One of each is used on the low group side and one of each on the high group side. The RMC separates the low group data into separate data streams. The separated data from the low group is then combined with the local loop subscribers and the overhead channel. This data is multiplexed for transmission to the high group output. Frame synchronization is maintained with each group by the particular group framing unit.

The built-in test equipment (BITE) CCA monitors the status of key signals on each CCA within the RMC. These signals are transmitted to the BITE CCA over a 16-bit bus. The BITE CCA sequentially addresses each CCA within the RMC and determines whether all key signals are present. If not, a one-second delay is started and the signals are tested again. After the one-second delay, if the fault persists, a summary error flag is raised.

1-9. ANALOG APPLIQUE
(fig. FO-2)

The analog applique CCA incorporates two fully independent channels for duplex processing. Each channel can simultaneously accept digital baseband NRZ data, transmit and accept analog voice, and transmit digitally encoded baseband NRZ. Analog voice data is gain-set, filtered and passed to an analog-to-digital (A/D) converter. There the voice input is encoded into a binarycoded bit stream which is formatted into NRZ baseband. Digital input data enters the CCA through S1 in the NORMAL position and enters the digital-to-analog converter (D/A). It passes out as analog data and is filtered, gain-set and outputted. Switches S1 and S2 have two positions, NORMAL and LOOP. In the LOOP position, the output of the A/D coder is looped into the D/A decoder. The built-in test equipment (BITE) function consists of tristate buffers which send out the BITE sensor status data by the BITE enable input. When a fault is detected the fault lamp is lit.

1-10. LOOP MODEM
(fig. FO-3)

The loop modem CCA provides for full duplex processing to and from two DSVTs. Its principal function is to accept diphase data from the DSVTs and demodulate this format to baseband NRZ. Conversely, it accepts the incoming NRZ data and converts it to diphase format. Input data is loaded into the modulator. After conversion to diphase, the data is clocked out at twice the input clock rate. A line driver feeds that data to the line through an isolation transformer which is center tapped and connected to a +52 V dc supply. Thus the data rides on a +52 V dc power source to power the DSVTs. The demodulator receives diphase data from the DSVTs through an isolation transformer. The data is processed by an equalizer to a CMOS-compatible level and is gated by a threshold detector to minimize noise interference. The data synchronizer detects data bit transitions and identifies a high speed clock pulse that occurs 3/4 of a bit-interval later. The demodulator samples the data with this clock and adds modulo 2. This converts the diphase data to baseband NRZ, which is buffered in the first in first out (FIFO) buffer and shifted out. The BITE bus gates out signals from internal BITE sensors to external BITE circuitry. External BITE circuitry lights the fault lamp when a loop modem CCA fault is detected.

1-11. MULTIPLEXER/DEMULTIPLEXER (fig. FO-4)

The multiplexer/demultiplexer extracts individual data channels (up to four) from a single bit stream, or formats the same number of individual data channels into a single bit stream. Each mux/demux CCA must be individually programmed to establish the framing pattern sequence. Three switches (thumbwheel on timing generator, channel rate toggle on timing generator, and low group toggle on low side group modem) are set to generate programming inputs. These switches control the timing of the enable outputs from the sequence generator to three muxes. One mux selects from the even-numbered channels, another selects from the odd-numbered channels, and the third selects from the overhead channel. A dedicated counter generates the select function to control which channel the mux selects. The select lines are constantly changing state as the counter is incremented by the group clock. The muxes include tristate readout and devices controlled by timed enable signals from the sequence generator. These read out data bits to structure the programmed group format. The three bit stream outputs from the three muxes are combined into one at the output control. The demux process is the same as that described above, except in reverse order. The functions are the same. The input data is a single bit stream presented to three muxes which sort out the bits in proper sequence to generate four channel outputs and an overhead channel output.

The BITE monitors on the mux/demux CCA consist of line drivers which are integrated within the circuits being monitored. These drivers are enabled by the BITE enable input from the BITE CCA. Once enabled, the 16-bit information outputs are made available to the BITE CCA. If the BITE CCA declares a mux/demux fault, the FAULT indicator lamp is lit.

1-12. GROUP FRAMING (fig. FO-5)

The group framing CCA consists of two circuit functions which are used for framing and synchronization. The framing portion consists mainly of counters which monitor the incoming data and detect any errors in the framing patterns. This action determines the frame status. The primary outputs from the framing circuits are

1-12. GROUP FRAMING—Continued

received side in/out of frame, and line side in/out of frame. The synchronizer portion interprets the frame status information and provides controls for the receive/transmit data and frame output pattern.

The input data to the framing portion consists of a stream of logic levels which are received from the group equipment and fed to the group modem. The sequence of data is partitioned into frames consisting of a predetermined number of consecutive bits. This is determined by the number of channels within the group data stream. The frame regenerator aligns itself with the framing pattern contained within the overhead channel of the data stream. Frame acquisition is a three level process which is controlled by the frame monitor. During each level, the outputs of the error counters are examined at the completion of a predetermined interval. If the number of errors is below threshold values, the acquisition level is advanced.

The synchronizer provides controls which enable synchronization with another multiplexer. The in-frame condition will control the data transfer to the multiplexer. When data is not in frame, data to the multiplexer is initiated, and a frame search is initiated. This search determines the location of the frame bit. Once the frame channel has been selected, it is continuously monitored during the frame maintenance mode to detect any loss of bit integrity.

1-13. GROUP MODEM
(fig. FO-6)

The group modem CCA accepts baseband NRZ data and modulates it to conditioned diphase, or it accepts conditioned diphase and demodulates it to baseband NRZ. It also provides for a local analog voice orderwire using a TS-3647/G telephone set (COU) for up to two miles separation.

NRZ group data enters the group modem CCA at dual flip-flop (FF) U12. The first FF samples the input baseband data with the group clock. When the data is ONEs, the FF toggles. This transition of the data-in represents a data 1 level. The exclusive OR logic function U7 gates this transition with the group clock. The resultant output is the diphase data. Modulo 2 is added by the action of the second half of dual flip-flop U12, as the diphase input is clocked group clock

1-13. GROUP MODEM—Continued

passed to the line driver U17 which provides the drive current to couple the signal into the coaxial line. This signal is also detected against a known reference dc which represents the minimum acceptable signal level. A BITE alarm is generated if this signal level falls below the minimum.

Analog Voice Orderwire (AVOW) inputs and outputs for the orderwire systems are provided on this CCA. Coupling transformers provide inputs and outputs from COU devices to the coax carrier which also serves to transmit data.

Conditioned diphase modulated group data is applied to the high pass filter. The high pass filter discriminates against the AVOW but passes the higher frequency data signals. An equalizer circuit provides phase and amplitude equalization to compensate for any such distortions acquired by the data signals during transmission over the CX-11230 cable. The equalizer compensation is fixed for the longest cable at 576 kb/s.

The signals are then passed to a limiter stage, where another operational amplifier further amplifies and limits the amplitude swings to emphasize the transition states. The hard limited data signals then pass to an edge detector circuit U4. Here two FFs in combination with logic gates generate clock signals for every data transition, whether positive or negative. In order to accomplish clock recovery it is necessary that the clock signal occur at 3/4 of the baud rate of the data. This is accomplished by FF U6 and counter U11: FF U6 accepts the diphase transitions which are clocked out by the group clock times 8. The output of U6 then presets counter U11 to produce an output after counting six inputs from the group clock times 8 (a period equal to 3/4 of the baud rate). This same clock signal, now the recovered clock, is fed back to U4 to synchronize the recovered clock to the station clock. U8 is a dual FF both of which are clocked by the recovered clock. The data input to the first FF is the hard limited diphase data. The output of this becomes the input to the second FF. The logic demodulates the conditioned diphase to baseband NRZ. A FIFO buffer arrangement is used to store, buffer, and read out the NRZ data to the demultiplexer. The FIFO buffer also generates BITE signals to indicate its status.

1-14. TIMING GENERATOR (fig. FO-7)

The timing generator generates clock signals to synchronize the processing functions of the RMC. A phase locked loop locks a voltage controlled crystal oscillator (VCO) to a timing source. The primary frequency of the VCO is 18.430 MHz.

Switch S2 (CHAN RATE) selects a divide by 2 or 4 to produce the basic clock frequencies 9.216 or 4.608 MHz from which all other clock frequencies are derived by synchronous division.

The output retime function consists of preprogrammed counters that count down the output group rate to 1 and 2 times the chosen rate which is passed to the mux/demux CCA for data formatting. A frequency is also derived to be used for feedback to the phase lock loop. The 32, 64, and 512 kHz outputs are passed through buffers to the functions shown. Similarly, the 2 kHz output from the frequency divider is counted down to be compatible with the incoming telemetry subchannel. In the event of an alarm, the output retime is preset to zero. The 150 Hz output from the frequency divider is also counted down by a timer. This timer generates controls for the long timeouts used in group framing by the loop modem and analog applique CCAs. The rate decoding logic is controlled by S2 to program the operation of the mux/demux. BITE monitoring outputs are generated by an input from the BITE CCA. This input enables 16 tristate line drivers that are integrated with the circuit functions that they monitor, and pass the BITE status signals to the BITE CCA. Thus, a timing generator fault will illuminate the fault indicator on the timing generator by the BITE error input from the BITE CCA.

1-15. BITE 2 (fig. FO-8)

The BITE 2 CCA evaluates the BITE sensor outputs for each CCA and determines which cards are at fault. It then lights the fault light on the defective card. The bus group 1 and bus group 2 select inputs from the BITE bus in pairs, such as bit 0 from group 1 and bit 8 from group 2, etc. Two additional multiplexers are programmed to characterize the bit selected from group 1 as either an external or internal fault. (External means an input to the RMC from outside.) Group 2 bits monitor internal

1-15. BITE 2—Continued

electrical functions and are thus preselected to be internal faults. The output of the group multiplexers is passed to fault monitors for both group 1 and group 2. If errors are detected, these generate outputs for the bit positions being examined. These outputs are processed by logic functions in the loop modem select latch. Here the logic is arranged to separate loop modem faults from all other faults.

For other than loop modem faults, an error condition is presumed if either or both of the two bits being examined is a fault. For the loop modem, however, an error is presumed only if one of the two bits being examined is a fault. Thus if a loop modem is not being used, faults would be indicated in both bit positions, but the logic would present a failure indication. Faults that pass the logic sorting in the loop modem select latch are stored in the fault control logic until the completion of the 16 bit muxing sequence. Here a fault will be inhibited if a fault was detected in the previous pass in the timing generator, group modem CCA, station clock activity or recovered clock. If the fault is not inhibited, a one-second delay is initiated. At the end of this delay the fault is checked again, and if present, the LED on that card is lit. A card advance counter cycles to address a pair of binary coded decimal decoders. These generate the enable signals to read the BITE output on the CCAs. The counter is also used for the card selection function for the addressable latches and LED driver. The RMC front panel test switch activates self test logic to verify proper operation of the BITE CCA. A sequence of outputs is initiated to drive all FAULT LEDs.

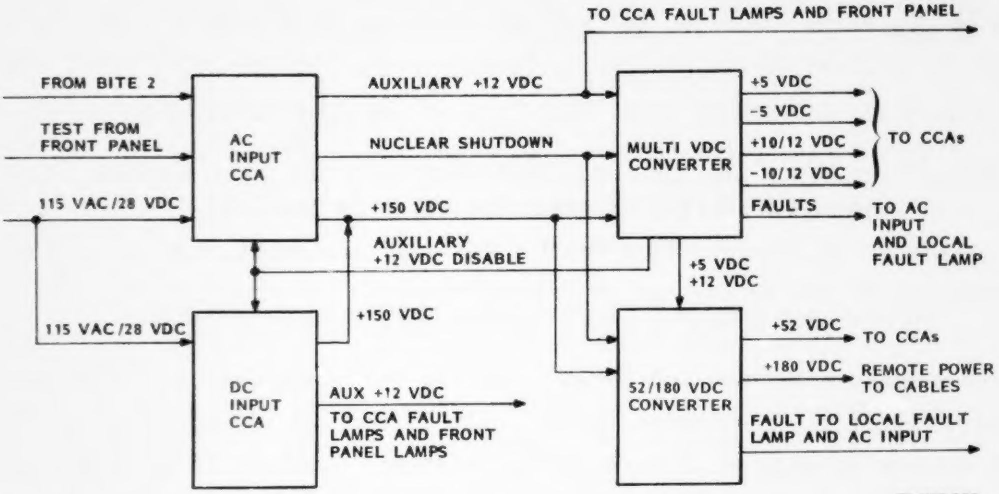
1-16. POWER SUPPLY

The RMC power supply consists of four functional sections:

a. Ac input CCA
b. Multi Vdc converter CCA
c. 52/180 Vdc converter CCA
d. Dc input CCA

The RMC power supply produces +5 ±0.25 V dc, -5 ±0.25 V dc, +10 ±0.5 V dc, -10 ±0.5 V dc, +52 ±2.5 V dc, +150 ±10 V dc, and +180 ± 10 V dc.

1-16. POWER SUPPLY—Continued


TO CCA FAULT LAMPS AND FRONT PANEL
FROM BITE 2
TEST FROM FRONT PANEL
115 VAC/28 VDC
AC INPUT CCA
AUXILIARY +12 VDC
NUCLEAR SHUTDOWN
+150 VDC
AUXILIARY +12 VDC DISABLE
MULTI VDC CONVERTER
+5 VDC
-5 VDC
+10/12 VDC
-10/12 VDC
TO CCAs
FAULTS
TO AC INPUT AND LOCAL FAULT LAMP
+5 VDC
+12 VDC
115 VAC/28 VDC
+150 VDC
DC INPUT CCA
AUX +12 VDC
TO CCA FAULT LAMPS AND FRONT PANEL LAMPS
52/180 VDC CONVERTER
+52 VDC
TO CCAs
+180 VDC
REMOTE POWER TO CABLES
FAULT TO LOCAL FAULT LAMP AND AC INPUT

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Using 115 V ac as a primary power input, the ac input CCA converts the 115 V ac to +150 V dc and also generates a +12 V dc auxiliary voltage. Both the +150 V dc and +12 V dc auxiliary are sent to the multi Vdc converter. The +12 V dc auxiliary also goes to the CCA and front panel lamps to energize them prior to operation of the multi Vdc converter's +12 V dc supply. Other inputs to the ac input CCA are from BITE 2 and the front panel TEST switch. Pressing the TEST switch lights up all CCA fault lamps and front panel lamps. The input from BITE 2 interrogates the power supply to determine its fault status. Nuclear shutdown commands from the ac input CCA go to both the multi Vdc converter and the 52/180 Vdc converter. The multi Vdc converter receives +150 V dc from either the ac input CCA or the dc input CCA and converts it to +5 V dc, -5 V dc, +10/12 V dc, and -10/12 V dc for use by the RMC CCAs. When the +10/12 V dc supply is operating, an auxiliary +12 V dc disable command is sent to the ac input CCA. Faults occurring in the multi Vdc converter are sent to the ac input CCA for monitoring by BITE 2 and to light the card fault lamp. Reference voltages of +5 V dc and +12 V dc go to the 52/180 Vdc converter CCA from the multi Vdc converter CCA. The 52/180 Vdc converter CCA receives +150 V dc from the ac input CCA or the dc input CCA and converts it to +180 V dc and +52 V dc. Regulation of the 52/180 Vdc is accomplished by using +5 V dc and +12 V dc from the multi Vdc converter CCA. Faults within the 52/180 V dc converter

1-16. POWER SUPPLY—Continued

light the card fault lamp and are transmitted to the ac input CCA for monitoring by BITE 2. The dc input CCA operates with a primary input of +28 V dc or a remote power feed of 180 V dc. It senses the primary power voltage to determine if the feed is 115 V ac, 28 V dc, or 180 V dc and internal circuits switch operation of the power supply to conform with the type of primary supply. The dc input CCA outputs +150 V dc for use by the multi Vdc converter and 52/180 Vdc converter. Auxiliary +12 V dc is also generated by the dc input CCA for the same purposes as provided by the ac input CCA.

a. Ac Input CCA (fig. FO-9). The ac input CCA produces +150 V dc and +12 V dc. The +150 V dc is for use by the multi Vdc CCA. The +12 V dc is for initial startup of certain power supply functions. The ac input CCA also contains circuits used to activate the fault lamps on the CCAs and on the front panel.

Ac power is applied to the +150 V rectifying circuits. The output of the rectifying circuits is held to a low current until application of the soft start signal from the multi Vdc CCA. Once the soft start signal is received, the full current level of the +150 V dc is fed to the multi Vdc CCA and the +52 Vdc CCA. Ac power is also applied to the +12 V step-down and rectifying circuits, where the 115 V ac is used to produce +12 V dc. The +12 V dc from the +12 V step-down and rectifying circuits is fed to the +12 V select circuits along with +12 V from the multi Vdc CCA. The +12 V select circuits determine which +12 V source is used. The +12 V dc provides starting voltage for the multi Vdc CCA until it is operational.

The nuclear shutdown circuit monitors for nuclear radiation. If any nuclear radiation is detected, a signal is sent to the +12 V crowbar fault circuits and the -12 V crowbar shutdown circuits, which in turn shut down the +12 V and -12 V supplies in the multi Vdc CCA. When the nuclear shutdown signal is applied to the multi Vdc CCA, a crowbar fault signal is fed back from the multi V dc CCA to the +12 V crowbar fault circuits. The +12 V crowbar fault circuits send a signal to the +12 V reference logic, which activates the fault lamps. The +12 V reference sense logic also monitors the +150 V dc line for a low level status. If a low level occurs, the fault lamp on the front panel is lit. If nuclear radiation is sensed, or the +150 V low sense occurs, the fault lamp on the CCA is lit.

1-16. POWER SUPPLY—Continued

b. Multi Vdc CCA (Fig. FO-10). The multi Vdc CCA supplies all of the voltages required by the RMC. These voltages include +5, -5, +10, -10 V dc.

Supply startup circuits utilize +150 V dc from the ac input CCA. The +150 V dc is used for sampling and then fed to the multi V dc switcher circuit. If the circuit breaker and power switch on the front panel are ON, signal B OFF is applied to the supply startup circuit, causing a sample of the +150 V dc to be routed to the +150 V hi/low sensing circuits and autostart and run sense logic.

The +150 V dc sample is used as a reference voltage in the +150 V hi/low sensing circuit and the autostart and run sense logic. As long as the +150 V dc is at the proper level, the output of the +150 V hi/low sense circuit is high. This high is fed to the clock and sum sense logic. A second input to the clock and sum sense logic is obtained from the autostart and run sense logic. This input is high when either the run reference input is a high or the clock and sum sense logic output is a high. If either input to the clock and sum sense logic is low, the clock is inhibited and no outputs are provided. When both inputs are high, the clock operates and an output is applied to the multi Vdc switcher circuits. The switcher produces the required stepped down voltages for use by each of the low voltage power supplies. The outputs of the power supplies provide the required operating voltages for the CCAs. The low voltages are BITE-sensored for an out-of-tolerance condition. If that condition exists, an output is sent to the ac input CCA. In the event of a low level status, the appropriate CCA and front panel PWR SPLY ALARM lamps are illuminated.

c. 52/180 Vdc (fig. FO-11). The 52/180 Vdc CCA generates two regulated dc outputs: +52 V dc and +180 V dc. 20 kHz clock U5 is a free running multivibrator generating a squarewave output at a frequency of approximately 20 kHz. Its output triggers switching transistor Q1, which is connected through a winding of transformer T1 to the 12 V supply. Q1 alternately conducts when the clock output is high and is turned off when the output is low. When Q1 is turned off the cessation of current flow induces in the secondary of T1 a voltage that turns on switching transistor Q3. Thus when Q1 conducts, Q3 is off and vice versa. Q3 is connected through a primary of transformer T2 to 150 V dc supply. Thus, Q3 produces a pul-

1-16. POWER SUPPLY—Continued

sating current through the primary of T2 causing an induced voltage in the secondary. This voltage is half wave rectified by rectifer CR8 and charges capacitor C7 to produce the 180 V dc output. This 180 V output is regulated to maintain the voltage constant. The output voltage is fed back to a comparator which compares a fixed fraction of this output against a 5 V reference. Any difference is amplified by U2. This difference is compared against a voltage generated by a winding of T3.

The primary of T3 is in series with T1; thus, the current pulse in T1 also flows through T3. This current pulse varies with time as a ramp due to the inductance of the winding, and induces a ramp voltage in the secondary of T3. This ramp voltage is compared to the amplified difference between the output 180 V dc and the fixed reference in U1. The output of U1 triggers SCR Q2, which is connected across a secondary winding of T1. When T1 fires, it shorts this winding, terminating the current pulse.

Two additional control systems monitor the output voltage to shut down the supply in the event of overcurrent or undercurrent condition. A load sensor across the 180 V supply develops a voltage as a function of the load current. Two comparators compare this voltage to a fixed reference. An overcurrent condition produces an output from the O/C comparator that enables a multivibrator arrangement in try again circuits U7 and U8. The squarewave from U7 and U8 is applied to the U1, U2 comparator circuit to control the duration of the current pulse in T1. The on cycle of the squarewave allows the voltage regulator function to operate normally. The off cycle causes Q2 to fire and quench the current pulse, thus shutting down the supply. This on and off cycle is called try again and keeps repeating until the overcurrent condition is cleared. The undercurrent comparator compares the output from the load sensor against the same fixed reference as the overcurrent comparator. The output of the undercurrent comparator (U/C), however, controls Q15 which conducts when an undercurrent condition is indicated. When Q15 conducts, it fires SCR Q14, which is connected across the 180V supply through a small load resistor. Thus, when Q14 fires, it effectively short circuits the 180 V output. The very small voltage drop across Q14 when it fires is passed to U1 causing the output to go high and firing Q2 to extinguish the current pulse through T1. The purpose of the undercurrent circuit is to remove the 180 V dc output, since the implication of an undercurrent condition is that the normal load across the supply has been disconnected.

1-16. POWER SUPPLY—Continued

The circuits comprised of Q8, Q16, and U10 function in response to a nuclear shutdown condition. A nuclear shutdown down signal fires SCR Q8 which disables switching transistor Q1. The nuclear shutdown signal also fires Q14 and Q12, which short out the 180 V and 52 V dc outputs. U10 compares the level of the 12 V supply against a fixed reference. When the 12 V supply falls to a certain level, the comparator output fires Q16 which disables Q1 to shut down both the 180 and 152 V supplies.

The functional performance of the 52 V supply in generating the regulated output is exactly the same as that described for the 180 V supply.

There is no overcurrent sensor in the 52 V supply, thus no try again circuitry. An overvoltage comparator samples a fixed reference against the output 52 V. If the voltage exeeds a certain level, the comparator output fires SCR Q12 which short circuits the outputs as in the 180 V supply.

d. Dc Input CCA (fig. FO-12). The dc input CCA generates 150 V dc and 12 V dc outputs from a 28 V dc input excitation. The input excitation arrangement will tolerate 115 V ac but the circuitry will shunt an ac input so that the unit will not respond to ac excitation. The operation is as follows. 115 V ac or 28 V dc is inputted to the CCA via one set of normally closed contacts on relay K4. From here the input is either shunted to ground by ac shunt (if ac input) or applied to control Q8. When Q8 conducts, charge current flows into a bank of capacitors which impress a voltage across VR6. The voltage drop across VR6 turns on the SCR Q1 which fires and closes relay K1. When K1 closes, the SCR continues to conduct through another set of relay contacts holding K1 closed as long as 28 V dc is present. The action of K1 also applies 28 V dc to voltage regulator VR19 which establishes a controlled voltage that is applied to 20 kHz clock circuit U1. This circuit is a free running multivibrator that generates a 20 kHz squarewave. The two outputs are of opposite polarities and reverse during each half cycle. The signals, when positive, cause a current to flow in the base of control Q6 and on the alternate half cycle in Q7. These currents are amplified by Q2 and Q4 causing a very large current to flow through the primaries of transformers T1 and T2 from the 28 V dc main. Thus, for each half cycle of the clock, the primaries of T1 and T2 are alternately switched and caused to conduct a large current which is extinguished when the multivibrator changes state. This puls-

1-16. POWER SUPPLY—Continued

ing action causes a large induced voltage in the secondary which excites the primary of T3 and induces the required large voltage in the secondary of T3. The secondary of T3 has two separate windings. One is passed to a bridge rectifier to produce 150 V dc. The other is passed to another bridge rectifier to produce 12 V dc.

A fault sensing circuit monitors the performance of the two dc outputs 150 V and 12 V. U2 is a device that comprises a light emitting diode and a transistor. It is energized from the 150 V dc supply. If the 150 V dc is present, the light emitting diode illuminates the transistor causing it to conduct. The light emitting diode properties are such that it will emit over a very broad range of supply voltage. Thus the 150 V dc can vary over a wide range and still operate the sensor. When the transistor in U2 conducts and the 12 V supply is present, Q9 conducts heavily, turning off Q10, which produces a no-fault signal. When either the 150 V supply or the 12 V supply, or both, are not operative, the output is low to indicate a fault. Relay K2 is operated by the 12 V regulated dc generated on the multi Vdc CCA. When the voltage comes up and K2 operates, it disconnects the 150 V dc from its temporary load while the multi Vdc CCA bus is coming up to voltage. It also disconnects 180 V dc external power feed from the indicator that warns of the presence of this input. This indicator will be illuminated when the external 180 V dc power feed is present and all other supply voltages are absent. Under these conditions K2 is relaxed and the 180 V dc is impressed on VR1 through a dropping resistor. This produces a reference 12 V dc which is outputted to indicate the presence of external 180 V dc.

CHAPTER 2
MAINTENANCE INSTRUCTIONS FOR DIRECT SUPPORT

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Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

2-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to Section III. Maintenance Allocation Chart (MAC). For Air Force, see applicable Table of Allowances (TA).

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

For Repair Parts and Special Tools List (RPSTL), refer to TM 11-5805-707-24P (Army) or TO 31W2-2TTC-24 (USAF).

Maintenance tools and equipment as authorized by the Maintenance Allocation Chart for Direct Support maintenance are as follows:

Tool Kit, Electronic Equipment, TK-105/G, 1 each
Digital Multimeter, AN/PSM-45 (or Air Force Equivalent) 1 each

2-3. REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (TM 11-5805-707-24P) covering Direct Support maintenance for the RMC (For Air Force, TO 31W2-2G-354).

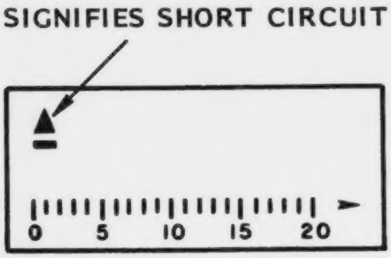
Section II. TROUBLESHOOTING

2-4. SYMPTOM INDEX

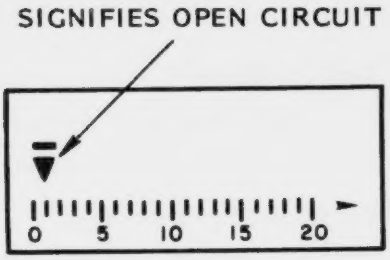
The symptom index relates fault symptoms to precise troubleshooting procedures for isolating each fault. If possible, debrief the operator/organizational maintenance technician for a general description of the problem. Try to verify the fault. If you observe the same fault symptom, try to observe all other indications and develop them into as accurate a symptom as possible. Next, look the symptom up in the symptom index. In the index, you will find a troubleshooting procedure referenced beside the symptom. Use this troubleshooting procedure to isolate and repair the fault. If you fail to isolate the fault, you have probably failed to define the symptom accurately or the problem must be addressed to a higher level of maintenance. Make another attempt to redefine the symptom, being careful to observe all

2-4. SYMPTOM INDEX—Continued

fault indications. In the following troubleshooting procedures, normal indications on the digital multimeter are specified as short circuit and open circuit. A short circuit is indicated on the digital multimeter as an up arrow. An open circuit is indicated on the digital multimeter as a down arrow.



METER INDICATOR



METER INDICATOR

EL1WL006

SYMPTOM INDEX

	Troubleshooting Procedure Paragraph	Troubleshooting Procedure Page
REAR COVER ASSEMBLY		
Fault cannot be corrected by replacing CCAs	2-5	2-4
OPERATOR CONTROLS		
MAIN PWR BRKR will not reset to ON position	2-6	2-34
POWER ON/OFF switch has no effect when switched to ON ...	2-6	2-37
POWER light will not light even after bulb replacement ..	2-6	2-30
REMOTE PWR OUT ON/OFF switch has no effect when switched to ON	2-6	2-32
REMOTE PWR OUT light will not light even after bulb replacement	2-6	2-29
ALARM TEST pushbutton has no effect when pushed	2-6	2-31
ALARM lights will not light when ALARM TEST pushbutton is pressed	2-6	2-26

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES

INITIAL SETUP

Applicable Configurations

All

Test Equipment

Digital Multimeter AN/PSM-45 with needlepoint probes
(or Air Force equivalent)

Tools and Special Tools

Tool Kit, Electronic Equipment, TK-105/G (or Air Force equivalent)

Materials/Parts

None

Personnel Required

1

References

Paragraph 2-13, Rear Cover Assembly Removal and Replacement

Equipment Conditions

All external wires and cables to RMC disconnected

Rear cover assembly removed for all procedures except
DSVT binding posts

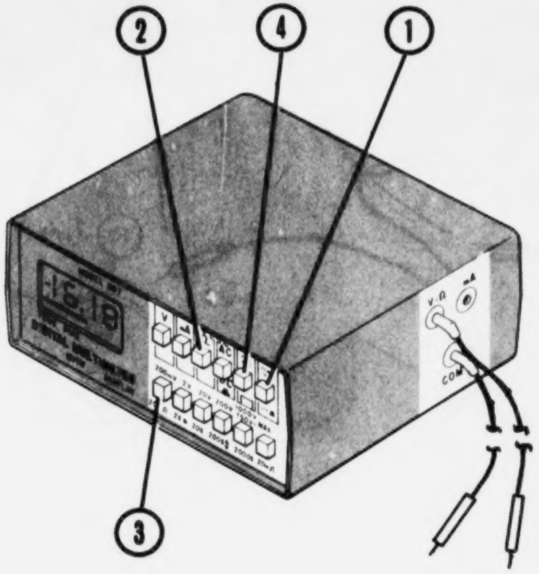
Special Environmental Conditions

None

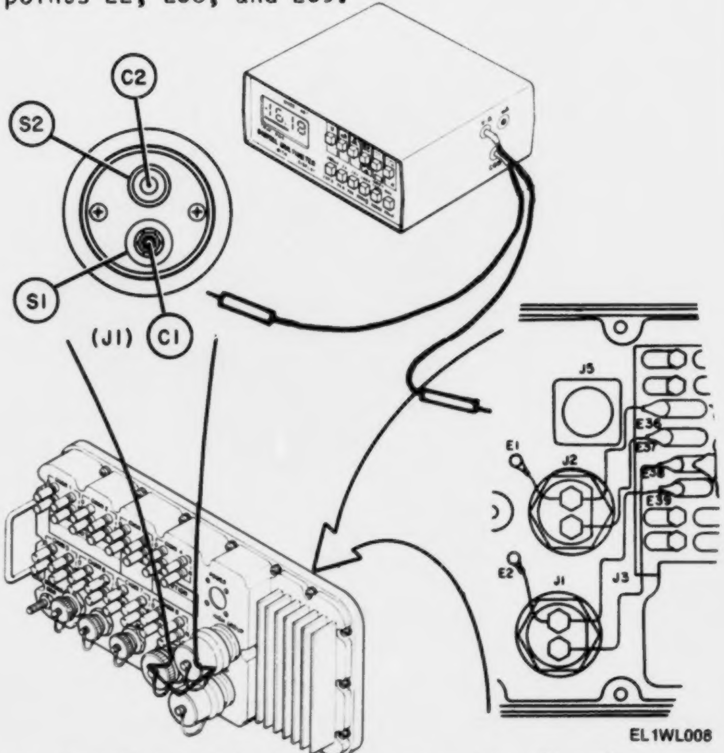
General Safety Instructions

None

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
	AN/PSM-45 TEST SETUP  EL1WL007 a. Set digital multimeter (dmm) POWER pushbutton ① to ON (in). b. Set dvm Ω pushbutton ② and 200 pushbutton ③ to IN position. c. Set PEAK HOLD pushbutton ④ to OUT position.		

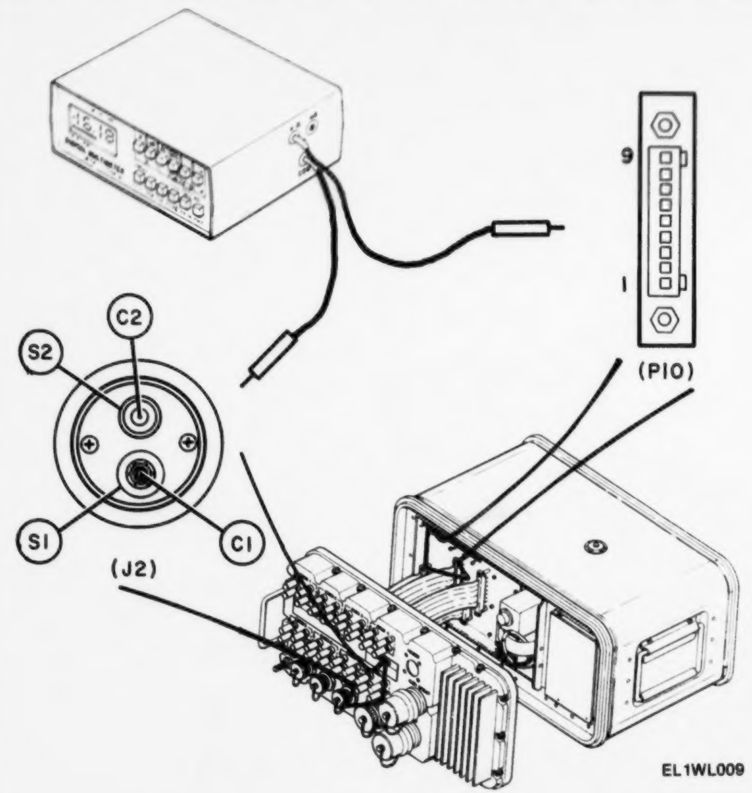
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
	REAR COVER ASSEMBLY TEST		NOTE See paragraph 2-13 for replacement procedures.
1.	Gain access to rear cover assembly by performing removal procedure for rear cover assembly. (See paragraph 2-13.)		
2.	Continuity check connector J1 (LOW GROUP) and connection points E2, E38, and E39.  C2 S2 S1 (J1) C1 J5 E36 E37 E38 E39 E1 J2 E2 J1 J3 EL1WL008 Connect dmm test leads between connector J1 and connection points E2, E38, and E39 in the following order and observe indication on dmm.		

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
2. (Cont)	J1-C1	E39	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J1-S1	E2		
	J1-C2	E38		
	J1-S2	E2		

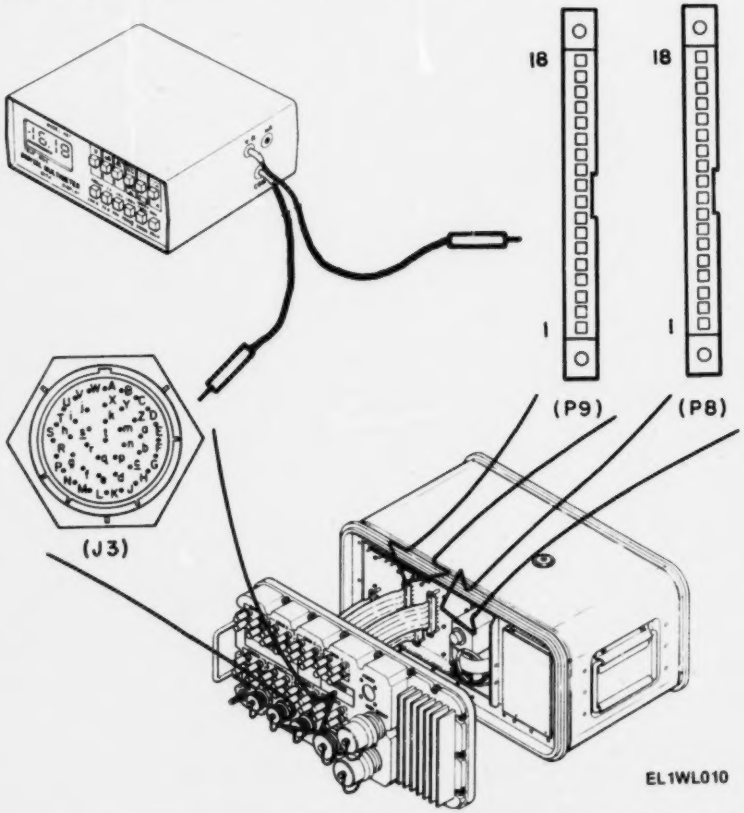
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
3.	Continuity Check Connectors J2 (HIGH GROUP) and P10.  EL1WL009 Connect dmm test leads between connectors J2 and P10 in the following order and observe indication on dmm.		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
3. (Cont)	J2-C1	P10-6	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J2-S1	P10-2		
	J2-C2	P10-3		
	J2-S2	P10-5		

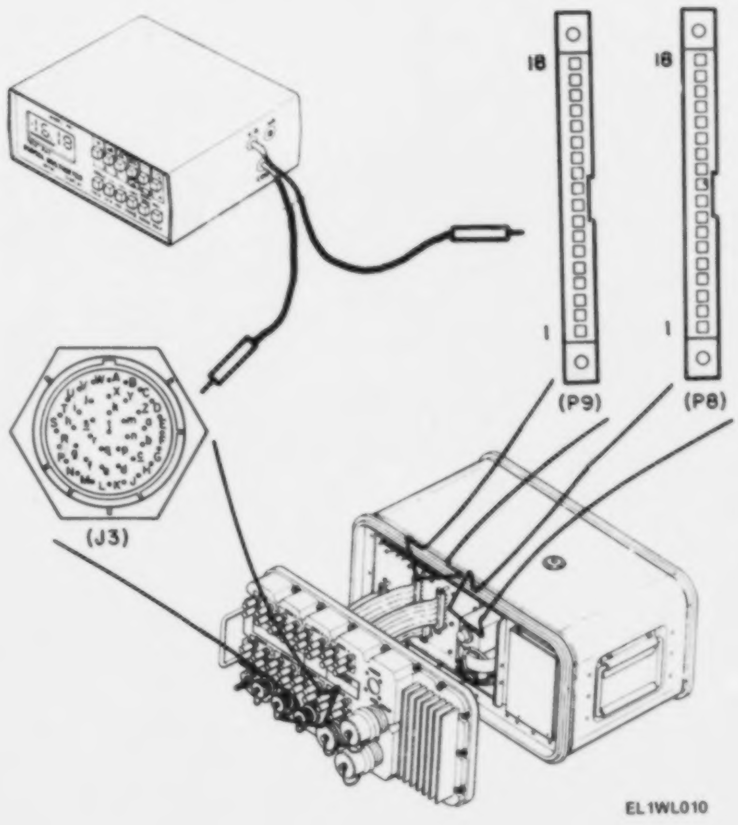
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
4.	Continuity Check Connectors J3, P8, and P9.  Connect dmm test leads between connectors J3, P8, and P9 the following order and observe indication on dmm.		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
4. (Cont)	Red Lead	Black Lead		
	J3-A	P9-2	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J3-B	P8-16		
	J3-C	P8-14		
	J3-D	P8-12		
	J3-E	P8-11		
	J3-F	P8-9		
	J3-G	P8-7		
	J3-H	P8-5		
	J3-J	P8-4		
	J3-K	P8-2		
	J3-M	P9-17		
	J3-N	P9-15		
	J3-P	P9-13		
	J3-q	P8-1		
	J3-R	P9-12		
	J3-S	P9-10		

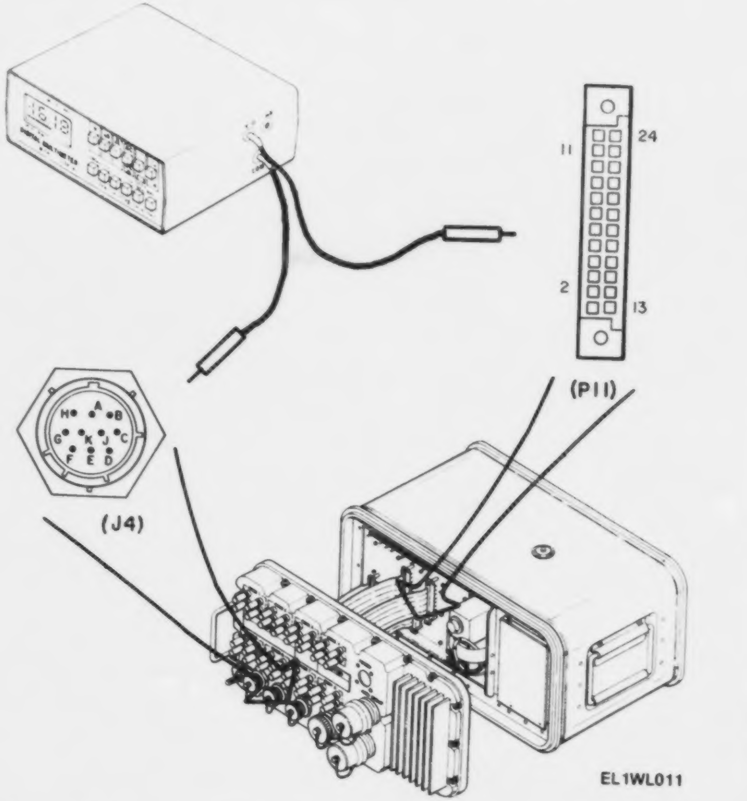
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
4. (Cont)	 18 1 (P9) 18 1 (P8) (J3) EL1WL010		

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
4. (Cont)	J3-T	P9-8	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J3-U	P9-7		
	J3-V	P9-5		
	J3-W	P9-3		
	J3-X	P8-17		
	J3-Y	P8-15		
	J3-Z	P8-13		
	J3-a	P8-10		
	J3-b	P8-8		
	J3-c	P8-6		
	J3-d	P8-3		
	J3-e	P9-16		
	J3-f	P9-14		
	J3-g	P9-11		
	J3-h	P9-9		
	J3-i	P9-6		
	J3-j	P9-4		

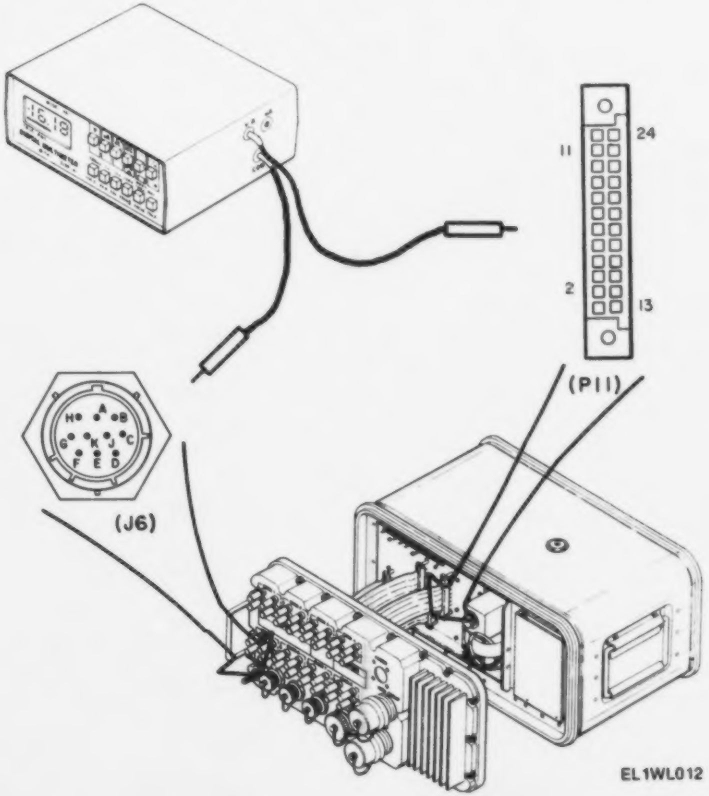
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
5.	Continuity Check Connectors J4 and P11.  11 24 2 13 (P11) H A B G K J C F E D (J4) EL1WL011 Connect dmm test leads between connectors J4 and P11 in the following order and observe indication on dmm.		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
5. (Cont)	Red Lead	Black Lead		
	J4-A	P11-10	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J4-B	P11-11		
	J4-C	P11-12		
	J4-D	P11-21		
	J4-E	P11-22		
	J4-F	P11-23		
	J4-G	P11-9		
	J4-H	P11-24		

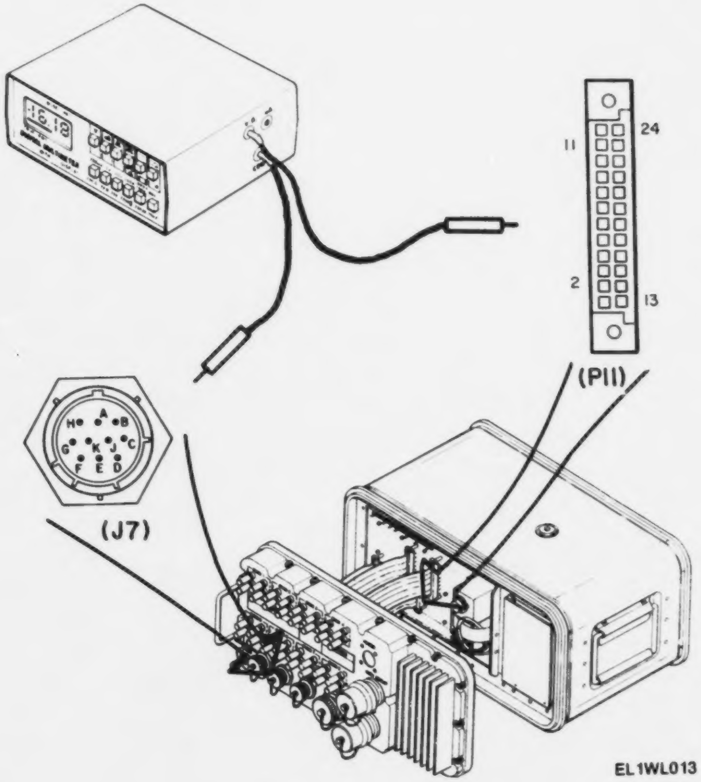
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
6.	Continuity Check Connectors J6 and P11.  24 11 2 13 (P11) H A B G K J C F E D (J6) EL1WL012 Connect dmm test leads between connectors J6 and P11 in the following order and observe indication on dmm.		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
6. (Cont)	J6-A	P11-17	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J6-B	P11-16		
	J6-C	P11-13		
	J6-D	P11-15		
	J6-E	P11-14		
	J6-F	P11-18		
	J6-G	P11-19		

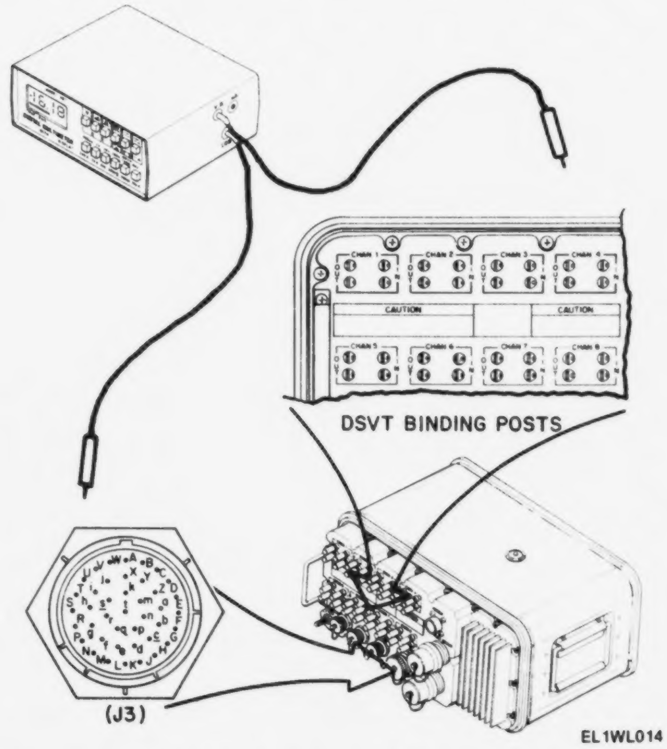
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
7.	Continuity Check Connectors J7 and P11.  24 11 2 13 (P11) A B H C K J G F E D (J7) EL1WL013 Connect test leads between connectors J7 and P11 in the following order and observe indication on dmm.		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
7. (Cont)	J7-A	P11-5	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	J7-B	P11-4		
	J7-C	P11-1		
	J7-D	P11-3		
	J7-E	P11-2		
	J7-F	P11-6		
	J7-G	P11-7		

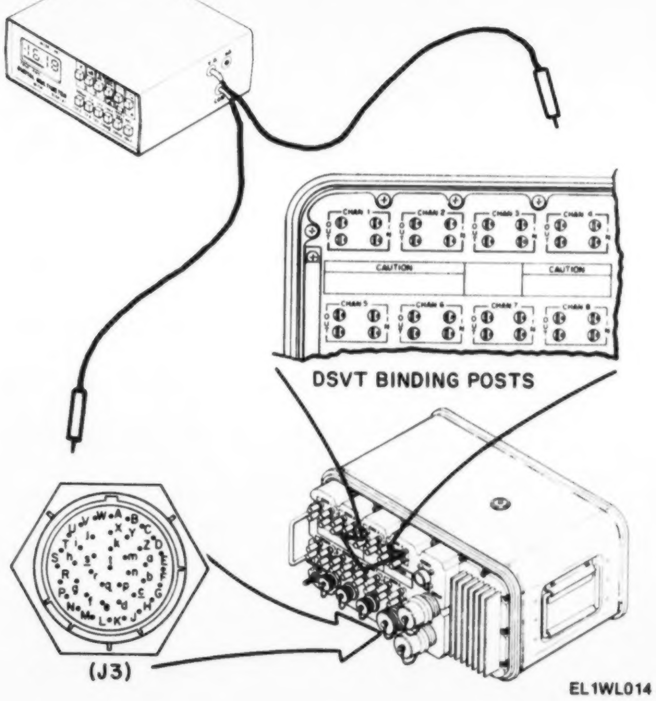
2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
8.	Continuity Check DSVT binding posts and J3.  CHAN 1 CHAN 2 CHAN 3 CHAN 4 CAUTION CAUTION CHAN 5 CHAN 6 CHAN 7 CHAN 8 DSVT BINDING POSTS (J3) EL1WL014 Connect dmm test leads between DSVT terminals and J3 in the following order and observe indication on dmm. NOTE (U) means upper binding post (L) means lower binding post		NOTE See paragraph 2-13 for replacement procedures.

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
8. (Cont)	Channel 1 Out (U)	J3-F	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	Channel 1 Out (L)	J3-X		
	Channel 1 In (U)	J3-b		
	Channel 1 In (L)	J3-B		
	Channel 2 Out (U)	J3-G		
	Channel 2 Out (L)	J3-Y		
	Channel 2 In (U)	J3-c		
	Channel 2 In (L)	J3-C		
	Channel 3 Out (U)	J3-H		
	Channel 3 Out (L)	J3-Z		
	Channel 3 In (U)	J3-J		
	Channel 3 In (L)	J3-D		
	Channel 4 Out (U)	J3-d		
	Channel 4 Out (L)	J3-E		
	Channel 4 In (U)	J3-K		
	Channel 4 In (L)	J3-a		

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
8. (Cont)	 CHAN 1 CHAN 2 CHAN 3 CHAN 4 CAUTION CAUTION CHAN 5 CHAN 6 CHAN 7 CHAN 8 DSVT BINDING POSTS (J3) EL1WL014		

2-5. REAR COVER ASSEMBLY TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
	Red Lead	Black Lead		
8. (Cont)	Channel 5 Out (U)	J3-h	All checks should show short circuit.	If indication not normal, replace rear cover assembly.
	Channel 5 Out (L)	J3-M		
	Channel 5 In (U)	J3-T		
	Channel 5 In (L)	J3-e		
	Channel 6 Out (U)	J3-U		
	Channel 6 Out (L)	J3-f		
	Channel 6 In (U)	J3-i		
	Channel 6 In (L)	J3-N		
	Channel 7 Out (U)	J3-V		
	Channel 7 Out (L)	J3-P		
	Channel 7 In (U)	J3-j		
	Channel 7 In (L)	J3-R		
	Channel 8 Out (U)	J3-W		
	Channel 8 Out (L)	J3-g		
	Channel 8 In (U)	J3-A		
	Channel 8 In (L)	J3-S		
9.	Replace rear cover assembly. (See paragraph 2-3.)			

2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES

INITIAL SETUP

Applicable Configurations

All

Test Equipment

Digital Multimeter AN/PSM-45 with needlepoint probes (or Air Force equivalent)

Tools and Special Tools

Tool Kit, Electronic Equipment, TK-105/G (or Air Force equivalent)

Materials/Parts

None

Personnel Required

1

References

Paragraph 2-8, Front Panel ALARM, POWER, or RMT PWR OUT Lamp Sockets Removal and Replacement

Paragraph 2-9, MAIN PWR BRKR Circuit Breaker Removal and Replacement

Paragraph 2-10, POWER ON/OFF Switch Removal and Replacement

Paragraph 2-11, ALARM TEST Switch Removal and Replacement

Paragraph 2-12, RMT PWR OUT Switch Removal and Replacement

Equipment Conditions

Power off

Power connector disconnected

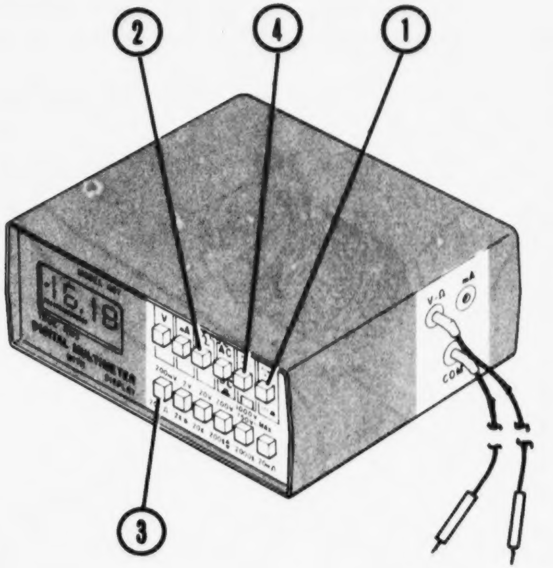
Special Environmental Conditions

None

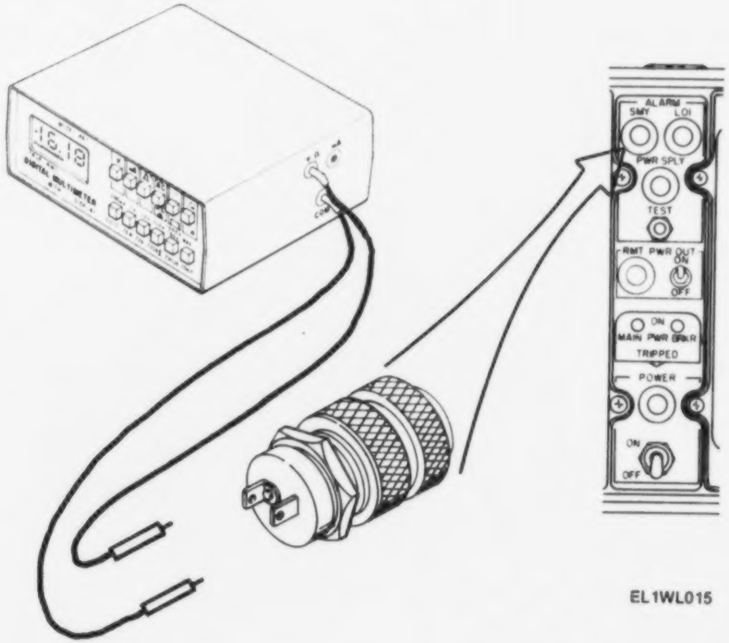
General Safety Instructions

None

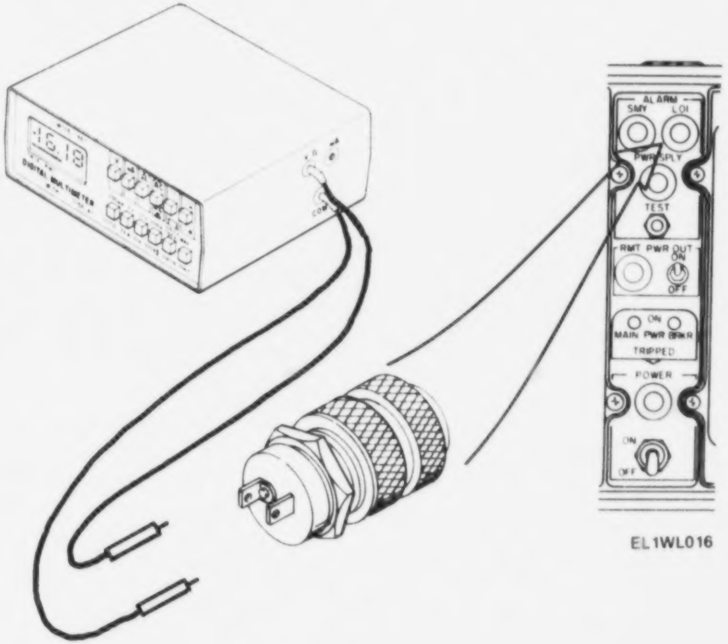
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
	AN/PSM-45 TEST SET UP  a. Set dmm POWER pushbutton ① to ON (in). b. Set dvm Ω pushbutton ② and 200 pushbutton ③ to IN position. c. Set PEAK HOLD pushbutton ④ to OUT position.		

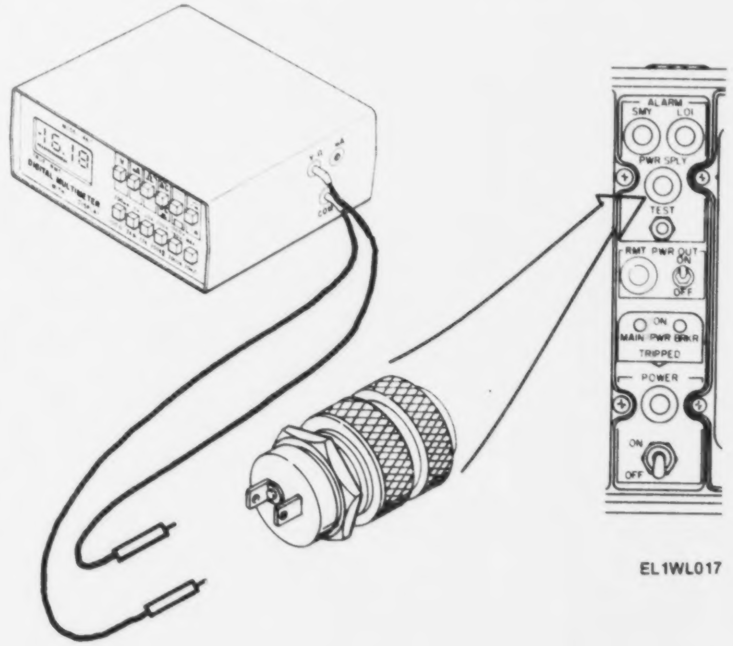
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
1.	ALARM SMY lamp socket		
	 ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF DIGITAL MULTIMETER EL1WL015		
	a. Gain access to rear of lamp socket by performing removal procedure for the lamp socket. (See paragraph 2-8.)		
	b. Replace lens with lamp installed onto lamp socket.		
	c. Connect dmm between terminals 1 and 2 and observe indication on dmm.	Short circuit	Replace lamp socket
	d. Replace lamp socket. (See paragraph 2-8.)		

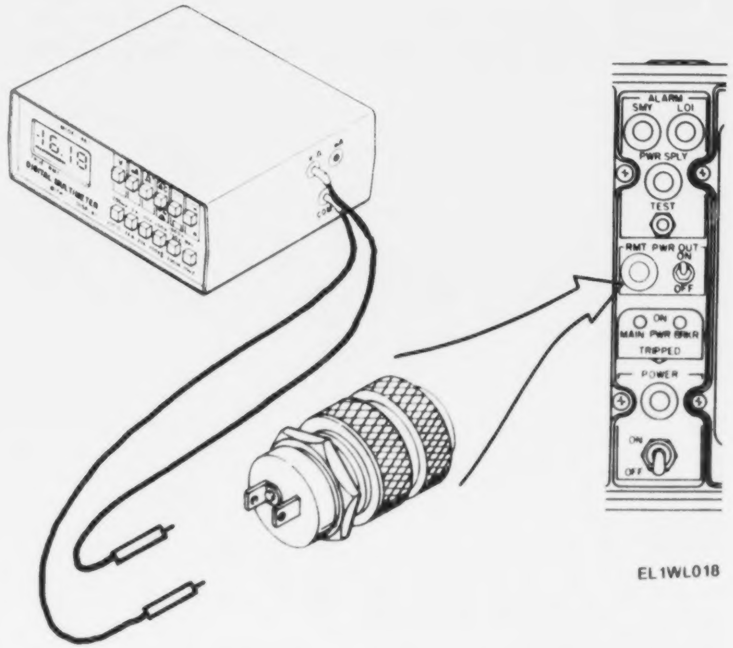
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
2.	ALARM LOI lamp socket		
	 ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF 16.18 DIGITAL MULTIMETER COM EL1WL016		
	a. Gain access to rear of lamp socket by performing removal procedure for the lamp socket. (See paragraph 2-8.)		
	b. Replace lens with lamp installed onto lamp socket.		
	c. Connect dmm between terminals 1 and 2 and observe indication on dmm.	Short circuit	Replace lamp socket
	d. Replace lamp socket. (See paragraph 2-8.)		

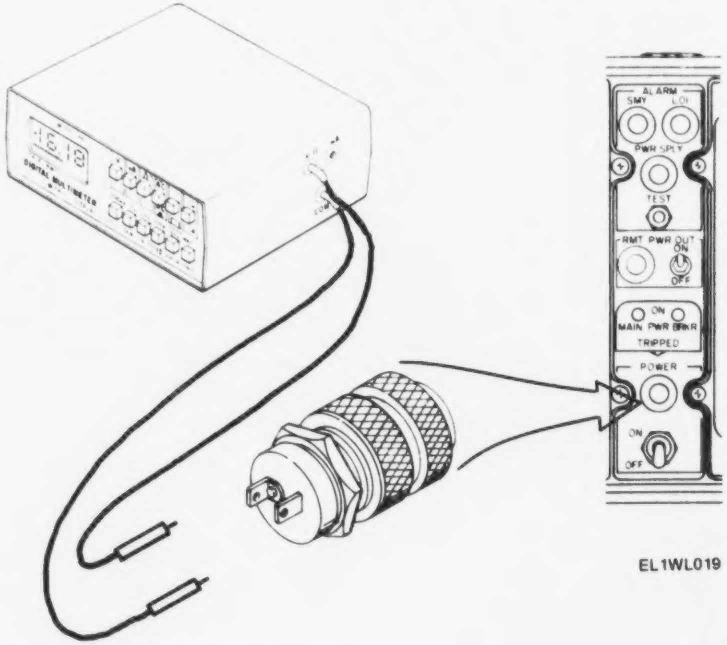
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
3.	ALARM PWR SPLY lamp socket  16.18 DIGITAL MULTIMETER COM ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF EL1WL017		
	a. Gain access to rear of lamp socket by performing removal procedure for the lamp socket (See paragraph 2-8.)		
	b. Replace lens with lamp installed onto lamp socket.		
	c. Connect dmm between terminals 1 and 2 and observe indication on dmm.	Short circuit	Replace lamp socket
	d. Replace lamp socket. (See paragraph 2-8).		

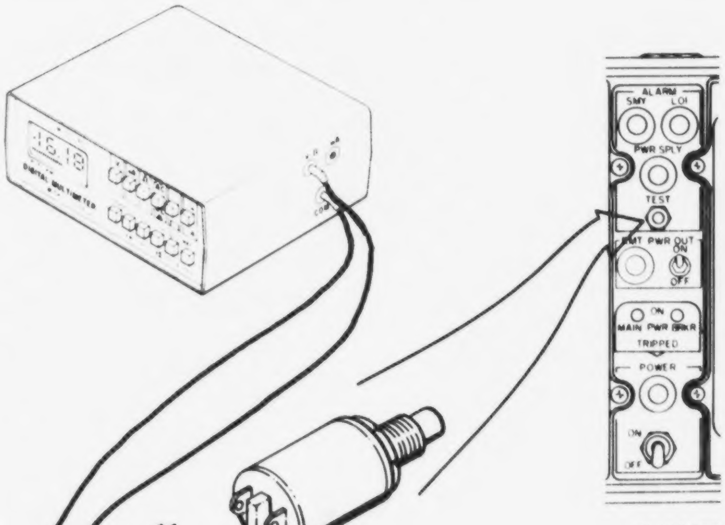
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
4.	RMT PWR OUT lamp socket		
	 ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF DIGITAL MULTIMETER COM EL1WL018		
	a. Gain access to rear of lamp socket by performing removal procedure for the lamp socket. (See paragraph 2-8.)		
	b. Replace lens with lamp installed onto lamp socket.		
	c. Connect dmm between terminals 1 and 2 and observe indication on dmm.	Short circuit	Replace lamp socket
	d. Replace lamp socket. (See paragraph 2-8.)		

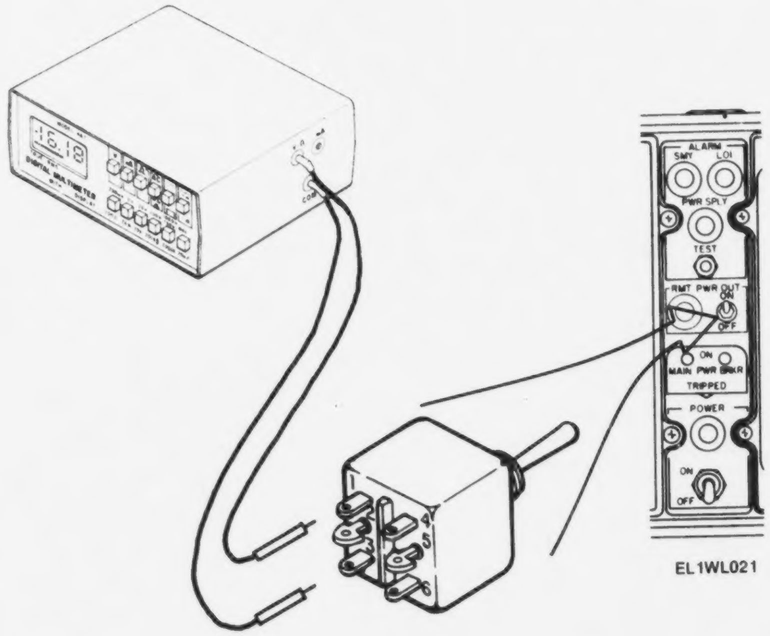
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
5.	POWER lamp socket		
	 DIGITAL MULTIMETER ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF EL1WL019		
	a. Gain access to rear of lamp socket by performing removal procedure for the lamp socket. (See paragraph 2-8.)		
	b. Replace lens with lamp installed onto lamp socket.		
	c. Connect dmm between terminals 1 and 2 and observe indication on dmm.	Short circuit	Replace lamp socket
	d. Replace lamp socket.		

2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
6.	ALARM TEST pushbutton switch  ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF DIGITAL MULTIMETER COM EL1WL020		
	a. Gain access to rear of lamp socket by performing removal procedure for ALARM TEST switch. (See paragraph 2-11.)		
	b. Connect dmm between terminals		
	c. Press and hold pushbutton and observe indication on dmm.	Short circuit	Replace pushbutton switch
	d. Replace pushbutton switch. (See paragraph 2-11.)		

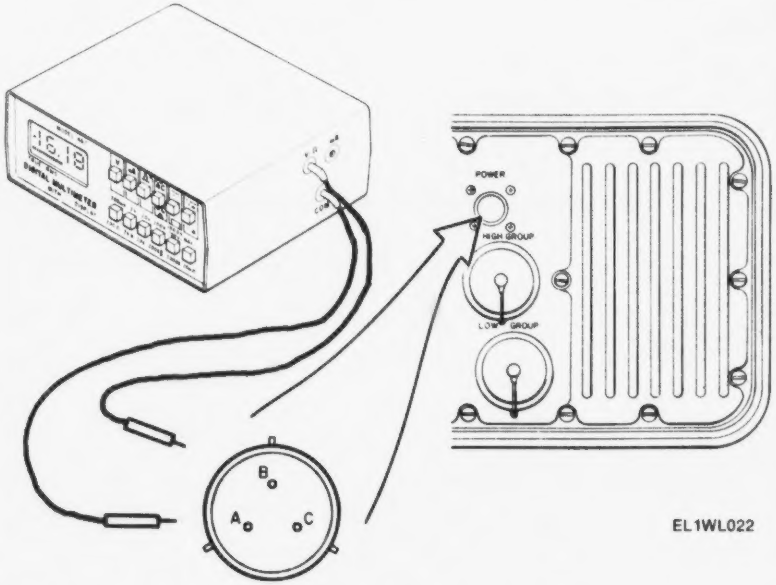
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
7.	RMT PWR OUT ON/OFF switch.  16.18 DIGITAL MULTIMETER ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF 4 5 6 EL1WL021		
a.	Gain access to rear of switch by performing removal procedure for REMOTE PWR OUT ON/OFF switch. (See paragraph 2-12.)		
b.	Set switch to OFF (down).		

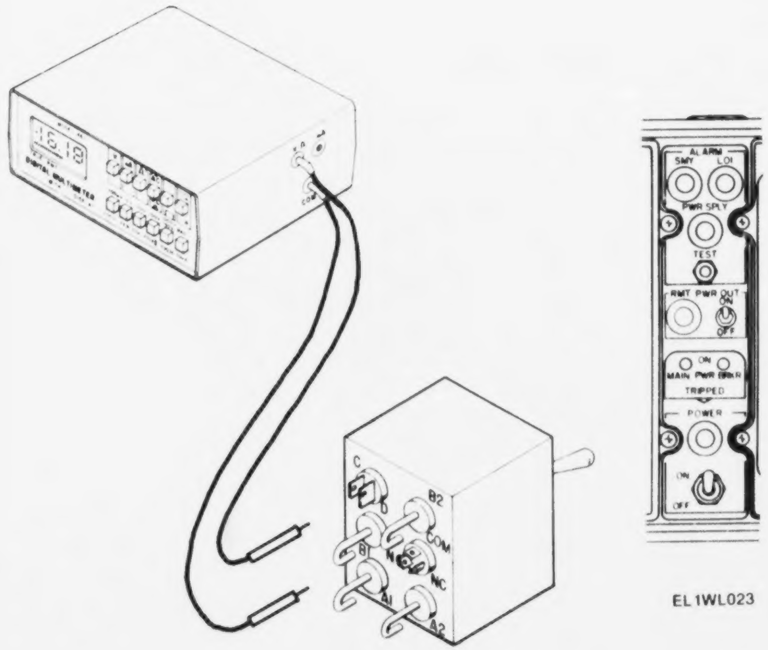
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action			Normal Indication	Corrective Action
7. (Cont)					
	c. Connect dmm between the following terminals and observe indication on dmm.				
		Red Lead	Black Lead		
		1	2	Short circuit	Replace switch
		4	5	Short circuit	Replace switch
	d. Set switch to ON (up).				
	e. Connect dmm between the following terminals and indication on dmm.				
		Red Lead	Black Lead		
		2	3	Short circuit	Replace switch
		5	6	Short circuit	Replace switch
	f. Replace switch. (See paragraph 2-12.)				

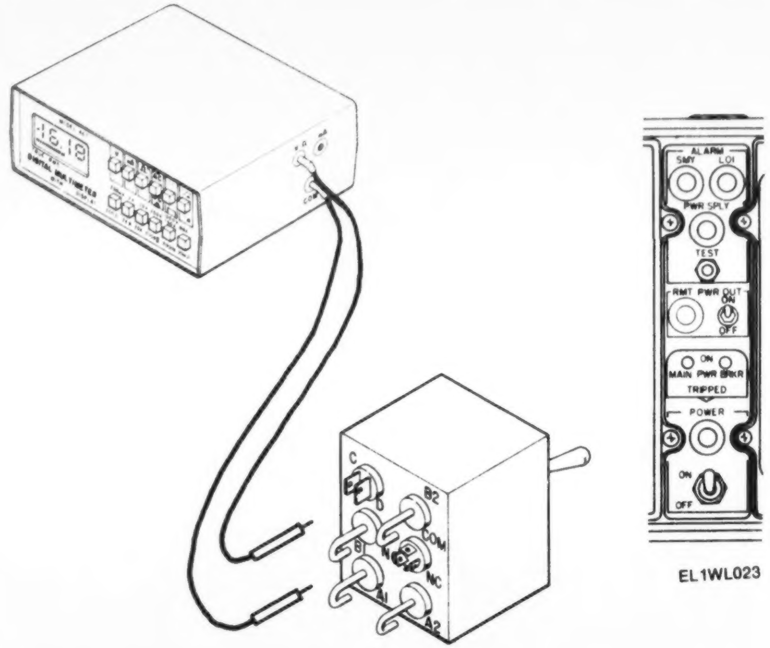
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
8.	MAIN PWR BRKR circuit breaker a. Set MAIN PWR BRKR to ON. b. Set POWER ON/OFF switch to ON. c. Insure that all power supply CCAs are installed in their proper locations.  16.18 DIGITAL MULTIMETER COM POWER HIGH GROUP LOW GROUP A B C EL1WL022		
	d. Connect dmm between terminals A and B and observe indication on dmm.	Open circuit	Perform steps f. through h.
	e. Connect dmm between terminals A and C and observe indication on dmm.	Open circuit	Replace circuit breaker

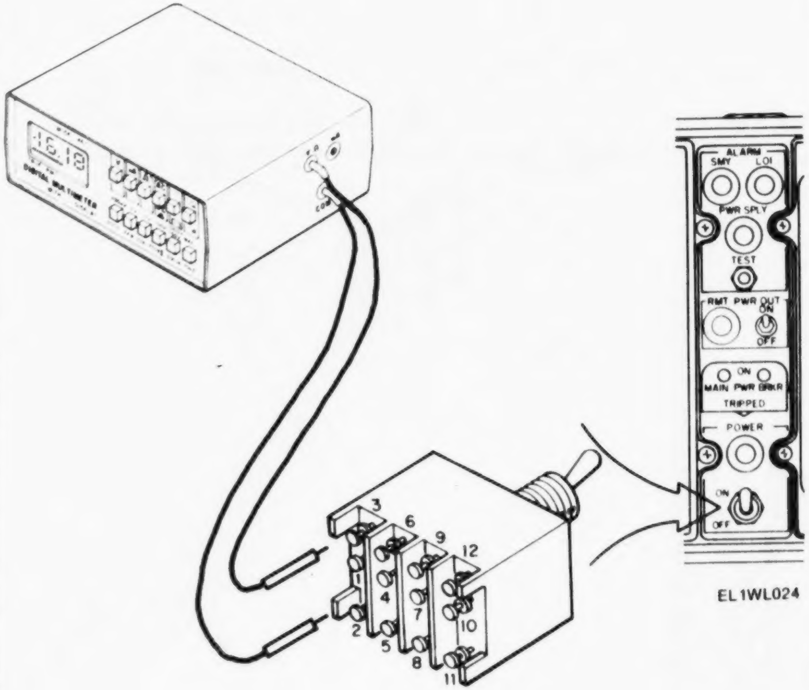
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
8. (Cont)	 DIGITAL MULTIMETER ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF C B2 COM NC B1 A1 A2 EL1WL023 f. Gain access to rear of circuit breaker by performing removal procedure for MAIN PWR BRKR. (See paragraph 2-9.) g. Set circuit breaker to ON (up).		

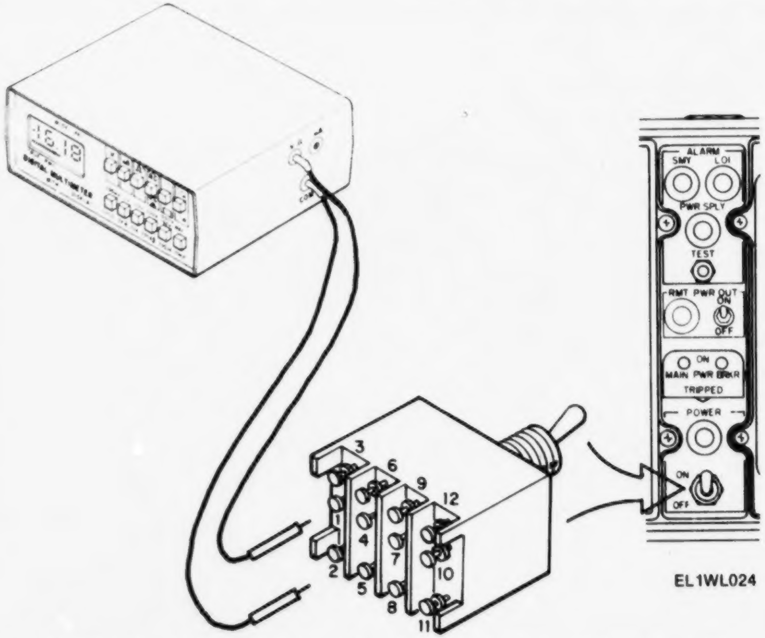
2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
8. (Cont)	 ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF C D B2 COM B1 NC A1 A2 EL1WL023		
	h. Connect dmm between the following terminals and observe indication on dmm.		
	Red Lead — Black Lead		
	A1 — B1	Short circuit	Replace circuit breaker
	A2 — B2	Short circuit	Replace circuit breaker
	C — D	Short circuit	Replace circuit breaker
	g. Replace MAIN PWR BRKR. (See paragraph 2-9.)		

2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action	Normal Indication	Corrective Action
9.	POWER ON/OFF switch  ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF 1 2 3 4 5 6 7 8 9 10 11 12 EL1WL024 a. Gain access to rear of switch by performing removal procedure for LOCAL ON/OFF switch. (See paragraph 2-10.) b. Set switch to OFF (down).		

2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
9. (Cont)	 DIGITAL MULTIMETER ALARM SMY LOI PWR SPLY TEST RMT PWR OUT ON OFF ON MAIN PWR BRKR TRIPPED POWER ON OFF 1 2 3 4 5 6 7 8 9 10 11 12 EL1WL024			
c.	c. Connect dmm between the following terminals and observe indication on dmm.			
	Red Lead	Black Lead		
	2	3	Short circuit	Replace switch
	5	6	Short circuit	Replace switch
	8	9	Short circuit	Replace switch
	11	12	Short circuit	Replace switch

2-6. OPERATOR CONTROLS AND INDICATORS TROUBLESHOOTING PROCEDURES—Continued

Item	Action		Normal Indication	Corrective Action
9. (Cont)				
	d. Set switch to ON (up).			
	e. Connect dmm between the following terminals and observe indication on dmm.			
	Red Lead	Black Lead		
	2	1	Short circuit	Replace switch
	5	4	Short circuit	Replace switch
	8	7	Short circuit	Replace switch
	11	10	Short circuit	Replace switch
	f. Replace POWER ON/OFF switch.			

Section III. MAINTENANCE

2-7. RMC REPAIR PROCEDURE

INITIAL SETUP

Applicable Configurations

All

Tools and Special Tools

Tool Kit, Electronic Equipment, TK-105/G or Air Force equivalent

Materials and Parts

See table of materials and parts

Personnel Required

1

References

TM 11-5805-707-12, paragraph 4-15, Removal and Replacement of Power Supply CCA Compartment Cover

TM 11-5805-707-12, paragraph 4-16, Removal and Replacement of Power Supply CCAs

Paragraph 2-16, Operator Controls and Indicators Troubleshooting Procedures

Paragraph 2-13, Rear Cover Assembly Removal and Replacement Procedure

2-7. RMC REPAIR PROCEDURE—Continued

LIST OF TASKS

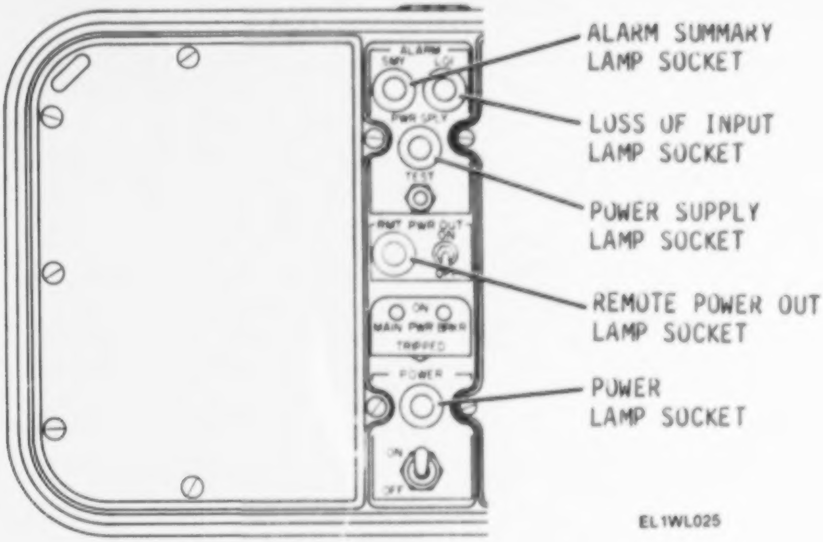
Task Number	Task	Task Reference Number (Para)	Troubleshooting Reference Number (Para)
1.	Removal and Replacement of ALARM SMY, LOI, PWR SPLY, and POWER ON lamp sockets.	2-8	2-6
2.	Removal and Replacement of ALARM TEST SWITCH	2-11	2-6
3.	Removal and Replacement of REMOTE POWER OUT ON/OFF Switch	2-12	2-6
4.	Removal and Replacement of MAIN PWR BRKR	2-9	2-6
5.	Removal and Replacement of POWER ON/OFF Switch	2-10	2-6
6.	Removal and Replacement of Rear Cover Assembly	2-13	2-5
7.	Removal and Replacement of DSVT Binding Posts	2-14	2-5
8.	Removal and Replacement of Rear Cover Assembly Support	2-15	-
9.	Removal and Replacement of Rear Cover Assembly Ground Rod	2-16	-
10.	Removal and Replacement of Rear Cover Assembly Panel Gasket	2-17	-
11.	Removal and Replacement of Rear Cover Assembly Input Power Filter Gasket	2-18	-
12.	Removal and Replacement of Rear Cover Assembly Captive Screws	2-19	-
13.	Removal and Replacement of Transport Cover Gasket	2-20	-
14.	Removal and Replacement of Transport Cover Latches	2-21	-

2-7. RMC REPAIR PROCEDURE—Continued

MATERIALS AND PARTS USED TO REPAIR RMC

Item	Reference Designation	Paragraph Number
MAIN PWR BRKR Circuit Breaker	CB1	2-9
ALARM TEST Switch	S1	2-11
RMT PWR OUT ON/OFF Switch	S2	2-12
POWER ON/OFF Switch	S3	2-10
ALARM SMY Lamp Socket	DS1	2-8
ALARM LOI Lamp Socket	DS2	2-8
ALARM PWR SPLY Lamp Socket	DS3	2-8
RMT PWR OUT Lamp Socket	DS4	2-8
POWER Lamp Socket	DS5	2-8
Rear Cover Assembly	-	2-13
DSVT Binding Posts	-	2-14
Rear Cover Assembly Support	-	2-15
Rear Cover Assembly Ground Rod	-	2-16
Rear Cover Assembly Panel Gasket	-	2-17
Rear Cover Assembly Input Power Filter Gasket	-	2-18
Rear Cover Assembly Captive Screws	-	2-19
Transport Cover Gasket	-	2-20
Transport Cover Latches	-	2-21
Gasket Adhesive	-	2-20
Primer	-	2-16
Sealing Compound	-	2-16

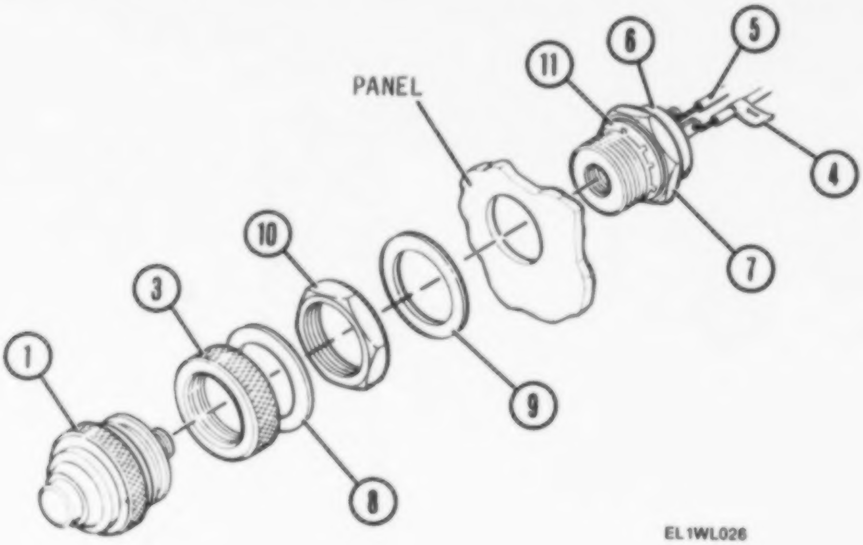
2-8. REMOVAL AND REPLACEMENT OF FRONT PANEL ALARM, POWER, AND RMT PWR OUT LAMP SOCKETS PROCEDURE


ALARM
SMY
LOI
PWR SPLY
TEST
RMT PWR OUT
ON
MAIN PWR BKR
TRIPPED
POWER
ON
OFF
ALARM SUMMARY LAMP SOCKET
LOSS OF INPUT LAMP SOCKET
POWER SUPPLY LAMP SOCKET
REMOTE POWER OUT LAMP SOCKET
POWER LAMP SOCKET
EL1WL025

PRELIMINARY PROCEDURES

- Remove power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)
- Remove power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

2-8. REMOVAL AND REPLACEMENT OF FRONT PANEL ALARM , POWER, AND RMT PWR OUT LAMP SOCKETS PROCEDURE—Continued



NOTE

This procedure applies to ALARM SUMMARY, ALARM PWR SPLY, ALARM LOSS OF INPUT, POWER, AND RMT PWR OUT lamp sockets.

REMOVAL

1 Unscrew lens cap ① from lamp socket.

2 Remove round nut ③ and rubber gasket ⑧ from lamp socket.

3 Using 9/16-inch socket wrench, remove mounting nut ⑩ and flat washer ⑨.

NOTE

When pushing socket through panel, insure that no hardware drops into case.

4 Push lamp socket back through panel and dress wires to allow access through CCA compartment opening for unsoldering.

5 Tag wires with masking tape ④ and number.

6 Unsolder all wires ⑤ from lamp socket ⑥ and remove faulty socket.

2-8. REMOVAL AND REPLACEMENT OF FRONT PANEL ALARM, POWER, AND RMT PWR OUT LAMP SOCKETS PROCEDURE—Continued

REPLACEMENT

1 Remove lens cap ① from replacement lamp socket.

2 Remove round nut ③, rubber gasket ⑧, mounting nut ⑩, and flat washer ⑨.

3 Position nut ⑦ on lamp socket housing for appropriate panel thickness.

NOTE

Before installation of new lamp socket, verify its performance by performing the Operator Controls and Indicators Troubleshooting Procedures. (See paragraph 2-6.)

4 Solder all wires ⑤ to replacement lamp socket ⑥, making sure to attach wires to correct socket terminals and remove tags ④.

5 Insert the replacement lamp socket ⑥, with nut ⑦ and star washer ⑪ through rear of front panel.

6 Using 9/16-inch socket wrench, secure lamp socket ⑥ to front panel with flat washer ⑨ and mounting nut ⑩.

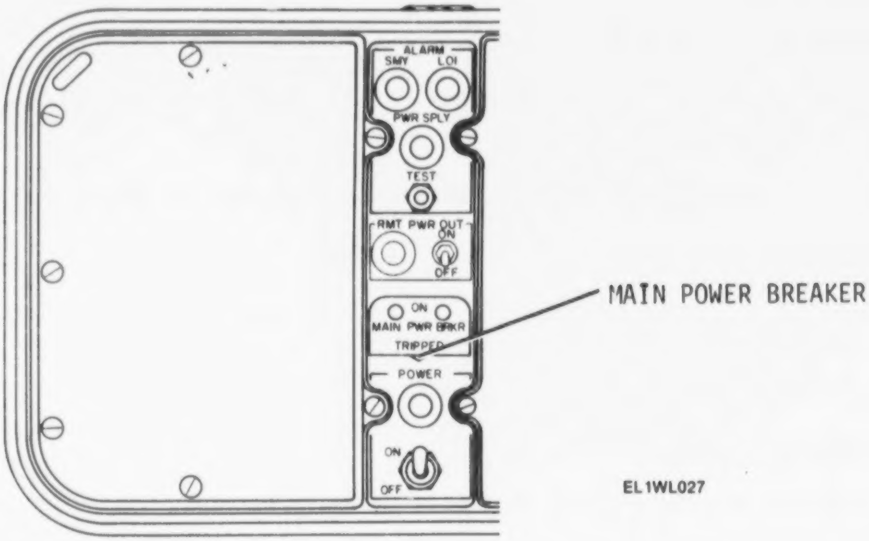
7 Install rubber gasket ⑧ and round nut ③ onto lamp socket ⑥.

8 Insert previously removed lens cap ① into socket, and screw lens cap ① into lamp socket.

9 Replace power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

10 Replace power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)

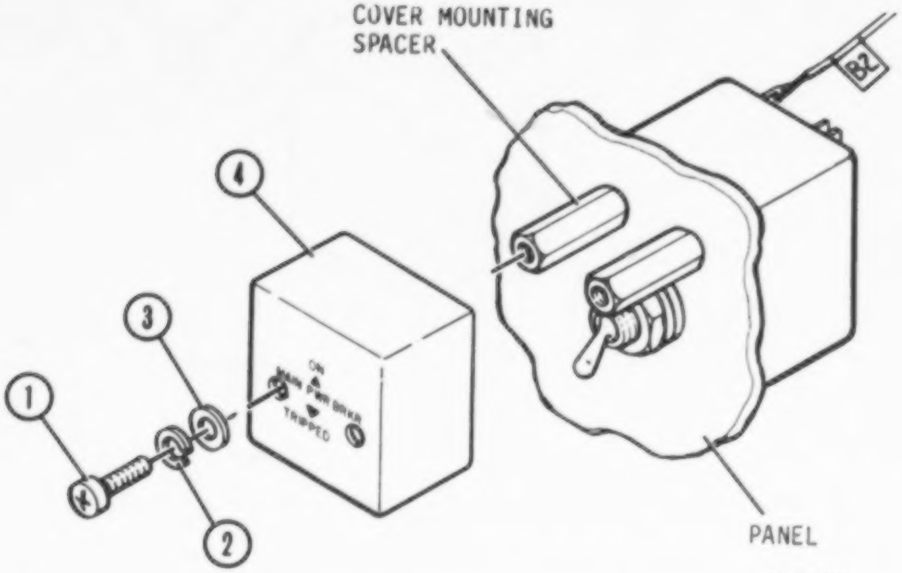
2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE


ALARM
SMY
LOI
PWR SPLY
TEST
RMT PWR OUT
ON
OFF
ON
MAIN PWR BRKR
TRIPPED
POWER
ON
OFF
MAIN POWER BREAKER
EL1WL027

PRELIMINARY PROCEDURES

- Remove power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)
- Remove power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

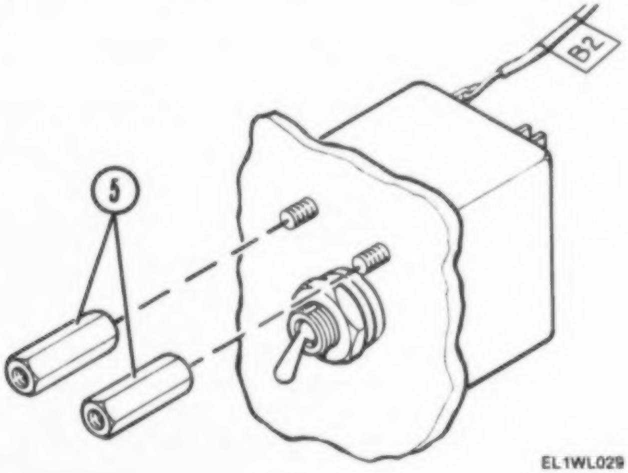
2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE—Continued


COVER MOUNTING SPACER
B2
④
③
①
②
MAIN PWR BRKR
ON
TRIPPED
PANEL

EL1WL028

REMOVAL

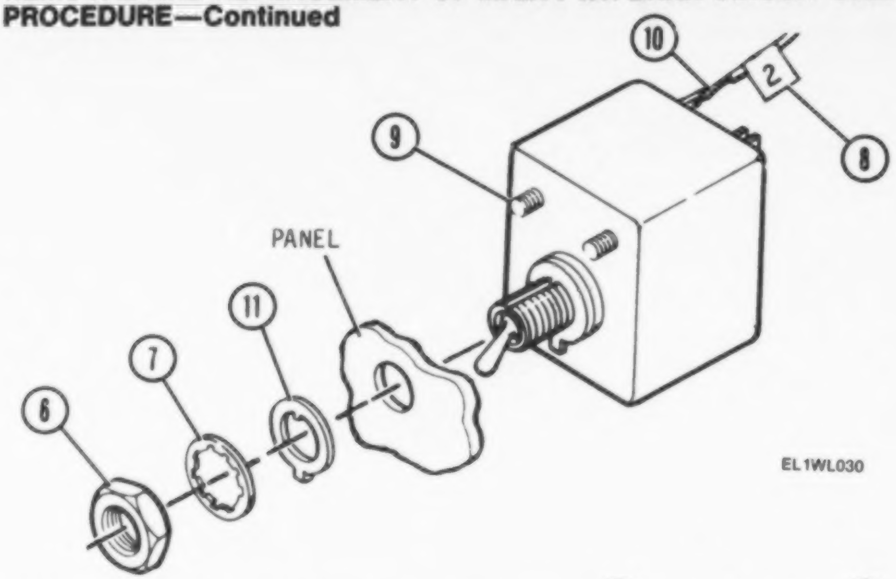
1 Using No. 2 Phillips screwdriver, remove two screws ①, two lockwashers ②, and two flat washers ③ which fasten circuit breaker protective cover ④ to front panel, and remove cover.



EL1WL029

2 Using 1/4-inch socket wrench, remove the two standoffs ⑤ from the front panel and circuit breaker.

2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE—Continued



3 Using 1/2-inch socket wrench, remove nut ⑥, star washer ⑦, and lock ring ⑪.

NOTE

When pushing circuit breaker through panel, insure that no hardware drops into case.

4 Push circuit breaker ⑨ back through panel and dress wires to allow access through CCA compartment opening for unsoldering.

5 Tag all wires ⑩ with masking tape ⑧ and number.

6 Unsolder all wires ⑩ from circuit breaker ⑨ and remove circuit breaker.

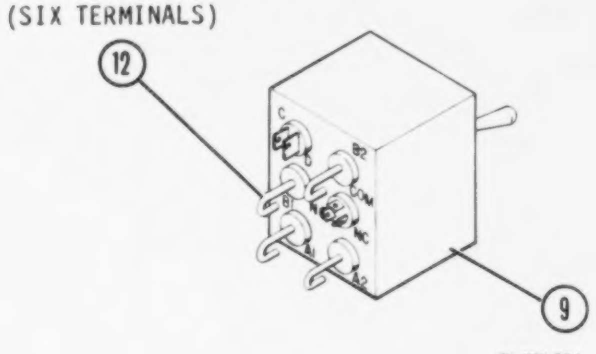
REPLACEMENT

NOTE

Before installation of new circuit breaker, verify its performance by performing the Operator Controls and Indicators Troubleshooting Procedures. (See paragraph 2-6.)

1 Prepare replacement circuit breaker for installation by removing hex nut ⑥, star washer ⑦, and lock ring ⑪.

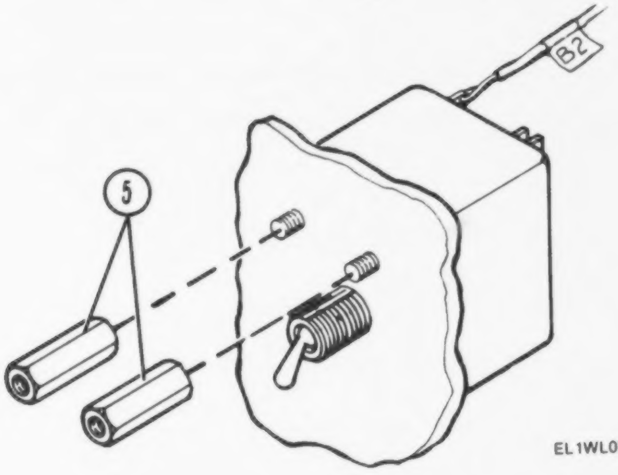
2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE—Continued



EL1WL031

2 Solder all wires ⑩ to replacement circuit breaker ⑨, making sure to attach wires to correct circuit breaker terminals ⑫, and remove tags ⑧.

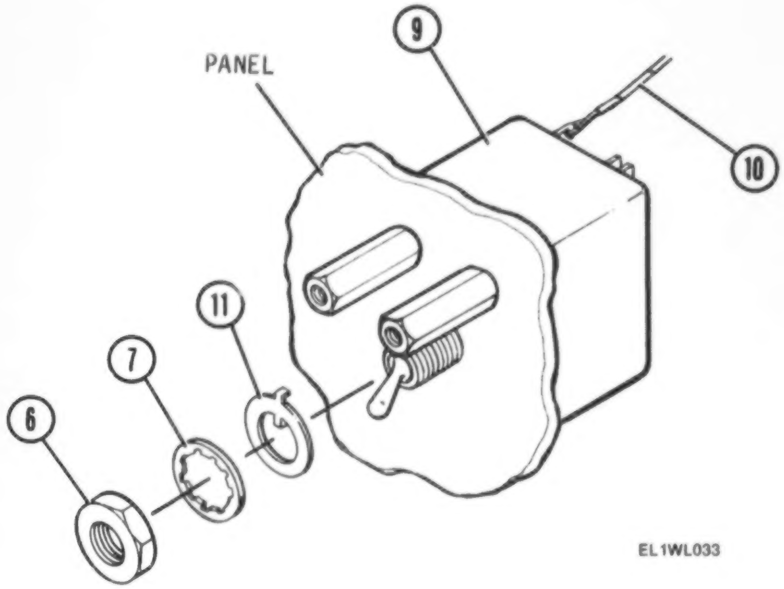
3 Insert the replacement circuit breaker ⑨ through rear of front panel.



EL1WL032

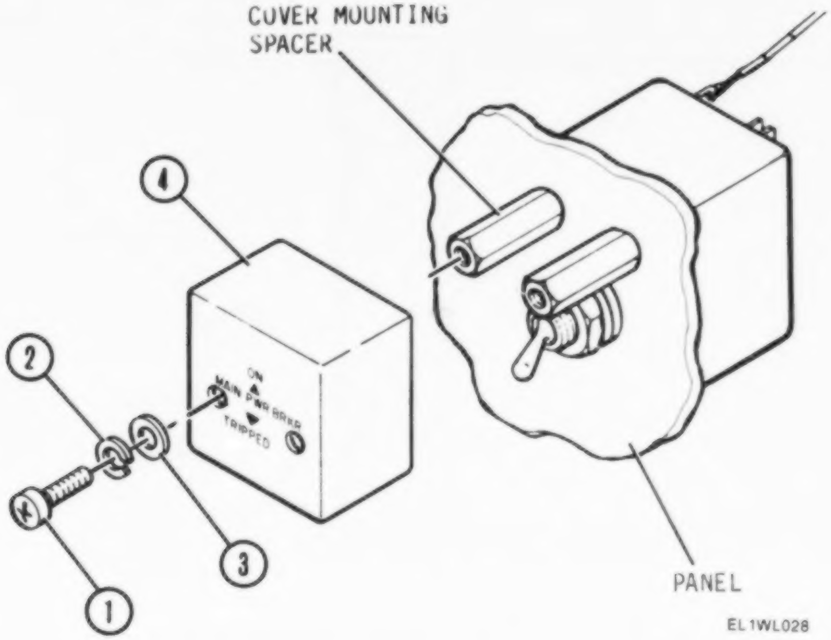
4 Using 1/4-inch socket wrench secure the two standoffs ⑤ to the front panel and circuit breaker.

2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE—Continued


PANEL
9
10
11
7
6
EL1WL033

5 Using 1/2-inch socket wrench, secure circuit breaker ⑨ to front panel with lock ring ⑪, star washer ⑦, and hex nut ⑥.

2-9. REMOVAL AND REPLACEMENT OF MAIN PWR BRKR CIRCUIT BREAKER PROCEDURE—Continued

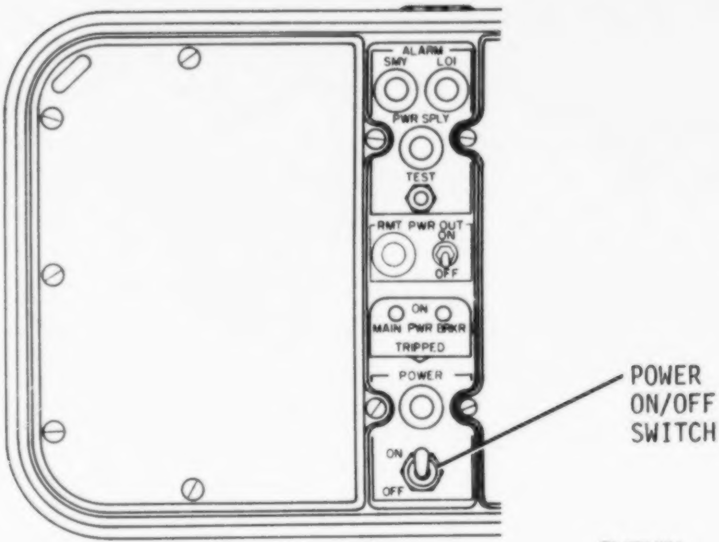

COVER MOUNTING SPACER
④
②
ON
MAIN PWR BRKR
TRIPPED
③
①
PANEL
EL1WL028

6 Replace circuit breaker protective cover plate ④ using previously removed flat washers ③, lockwashers ②, and screws ①.

7 Replace power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

8 Replace power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)

2-10. REMOVAL AND REPLACEMENT OF POWER ON/OFF SWITCH PROCEDURE


ALARM
SMY
LOI
PWR SPLY
TEST
RMT PWR OUT
ON
OFF
ON
MAIN PWR BRKR
TRIPPED
POWER
ON
OFF
POWER ON/OFF SWITCH

EL1WL034

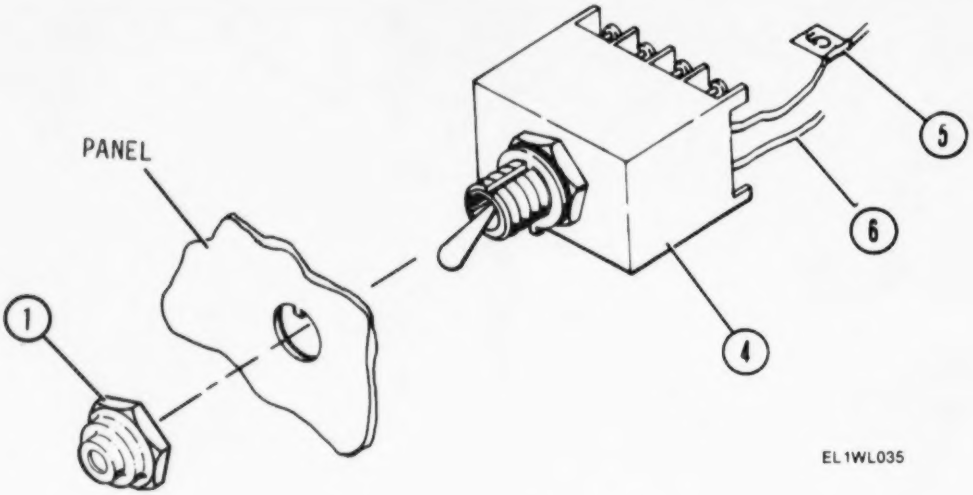
PRELIMINARY PROCEDURES

- Remove power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)
- Remove power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

2-10. REMOVAL AND REPLACEMENT OF POWER ON/OFF SWITCH PROCEDURE —Continued

CAUTION

Caution should be taken not to damage the boot over the nut.



REMOVAL

1 Using 5/8-inch socket wrench, remove nut ①.

NOTE

When pushing switch through panel, insure that no hardware drops into case.

2 Push switch ④ back through panel and dress wires to allow access through CCA compartment opening for unsoldering.

3 Tag wires ⑥ with masking tape ⑤ and number.

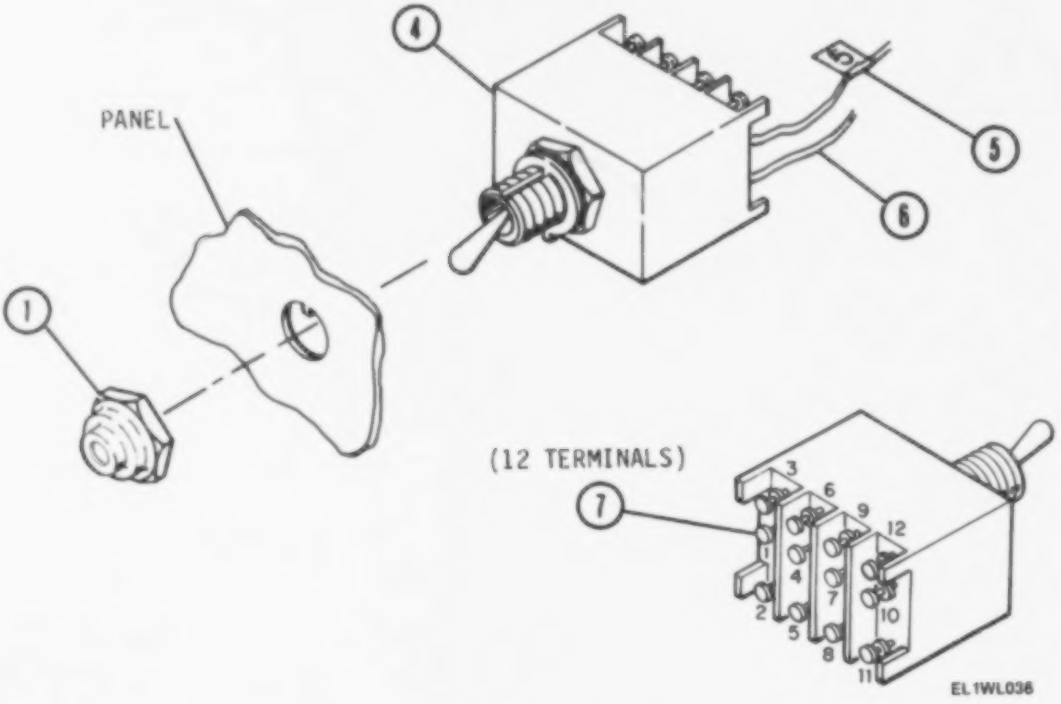
4 Unsolder all wires ⑥ from switch ④ and remove switch.

REPLACEMENT

NOTE

Before installation of new power switch, verify its performance by performing the Operator Controls and Indicators Troubleshooting Procedures. (See paragraph 2-6.)

2-10. REMOVAL AND REPLACEMENT OF POWER ON/OFF SWITCH PROCEDURE —Continued



1 Prepare replacement switch for installation by removing hex nut ①.

2 Solder all wires ⑥ to replacement switch ④, making sure to attach wires to correct switch terminals ⑦, and remove tags ⑤.

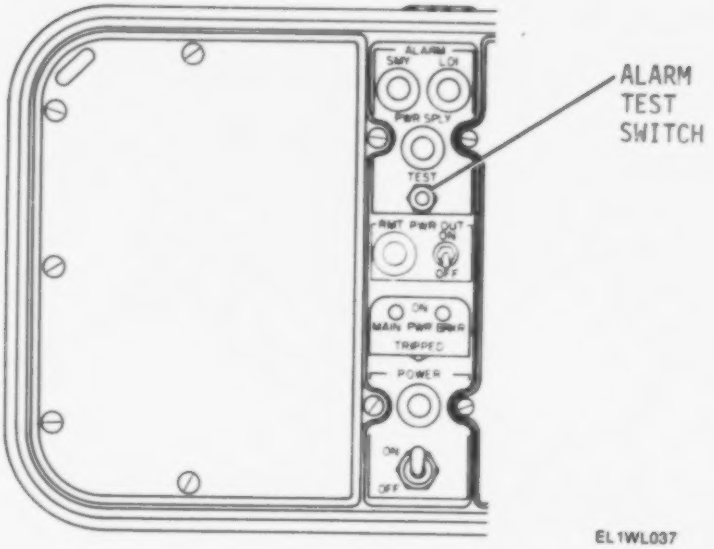
3 Insert the replacement switch ④ through rear of front panel.

4 Using 5/8-inch socket wrench, secure switch to front panel with hex nut ①.

5 Replace power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

6 Replace power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)

2-11. REMOVAL AND REPLACEMENT OF ALARM TEST SWITCH PROCEDURE


ALARM
SBY
LOI
PWR SPLY
TEST
RMT PWR OUT
ON
OFF
ON
MAIN PWR BRKR
TRIPPED
POWER
ON
OFF
ALARM TEST SWITCH

EL1WL037

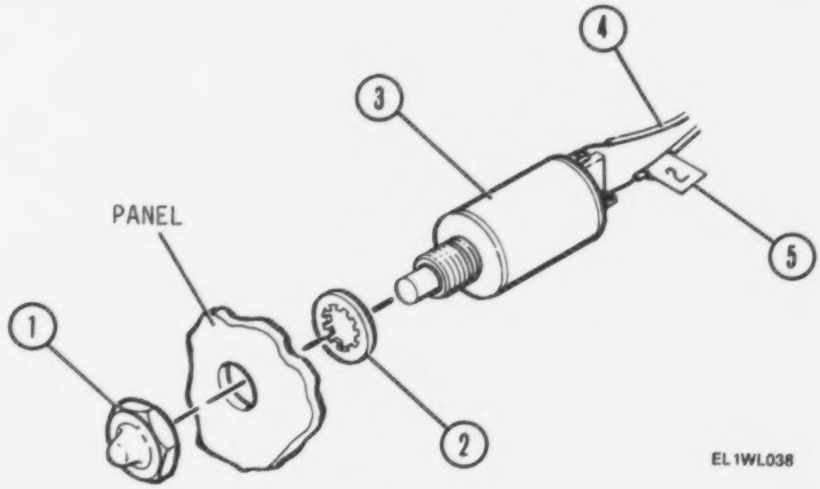
PRELIMINARY PROCEDURES

- Remove power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)
- Remove power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

2-11. REMOVAL AND REPLACEMENT OF ALARM TEST SWITCH PROCEDURE —Continued

CAUTION

Caution should be taken not to damage the boot over the nut.



REMOVAL

1 Using 3/8-inch socket wrench, remove nut ①.

NOTE

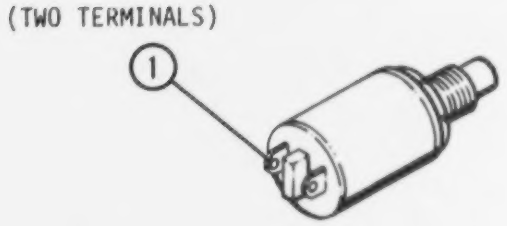
When pushing switch through panel, insure that no hardware drops into case.

2 Push switch ③ and star washer ② back through front panel and dress wires to allow access through CCA compartment opening for unsoldering.

3 Tag all wires ④ with masking tape ⑤ with switch name.

4 Unsolder all wires ④ and remove switch ③.

2-11. REMOVAL AND REPLACEMENT OF ALARM TEST SWITCH PROCEDURE —Continued



EL1WL039

REPLACEMENT

NOTE

Before installation of new switch, verify its performance by performing the Operator Controls and Indicators Troubleshooting Procedures. (See paragraph 2-6.)

1 Prepare replacement switch ③ for installation by removing nut ① and star washer ②.

2 Solder all wires ④ to replacement switch ③, and remove tags ⑤.

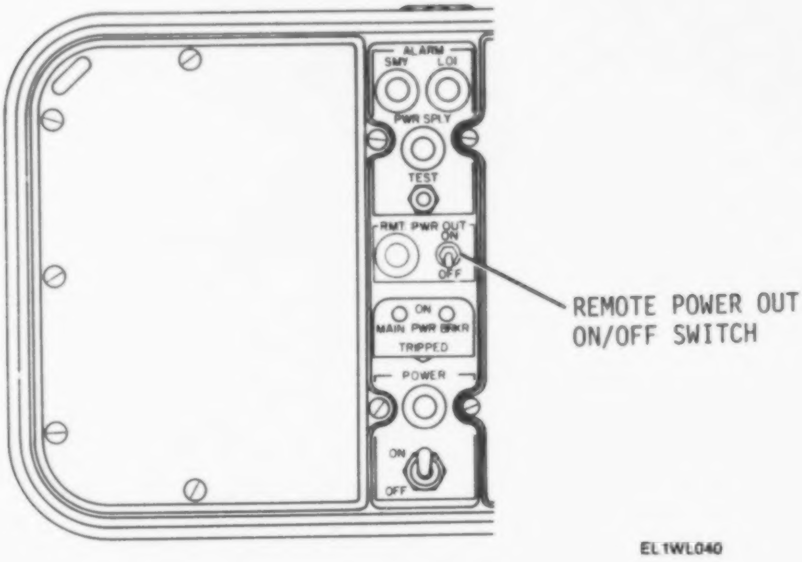
3 Insert replacement switch ③ through rear of front panel.

4 Using 3/8-inch socket wrench, secure switch ③ to front panel with hex nut ①.

5 Replace power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

6 Replace power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)

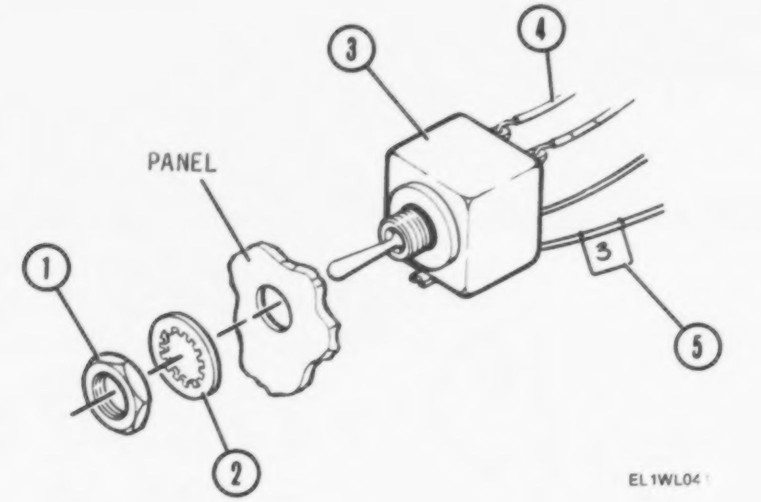
2-12. REMOVAL AND REPLACEMENT OF RMT PWR OUT ON/OFF SWITCH PROCEDURE


ALARM
SMY
LOI
PWR SPLY
TEST
RMT PWR OUT
ON
OFF
REMOTE POWER OUT ON/OFF SWITCH
ON
MAIN PWR BRKR
TRIPPED
POWER
ON
OFF
EL1WL040

PRELIMINARY PROCEDURES

- Remove power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)
- Remove power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

2-12. REMOVAL AND REPLACEMENT OF RMT PWR OUT ON/OFF SWITCH PROCEDURE—Continued



REMOVAL

1 Using 5/16-inch socket wrench, remove nut ① and star washer ②.

NOTE

When pushing switch through panel, insure that no hardware drops into case.

2 Push switch ③ back through front panel and dress wires to allow access through CCA compartment opening for unsoldering.

3 Tag all wires ④ with masking tape ⑤ and number.

4 Unsolder all wires ④ and remove switch ③.

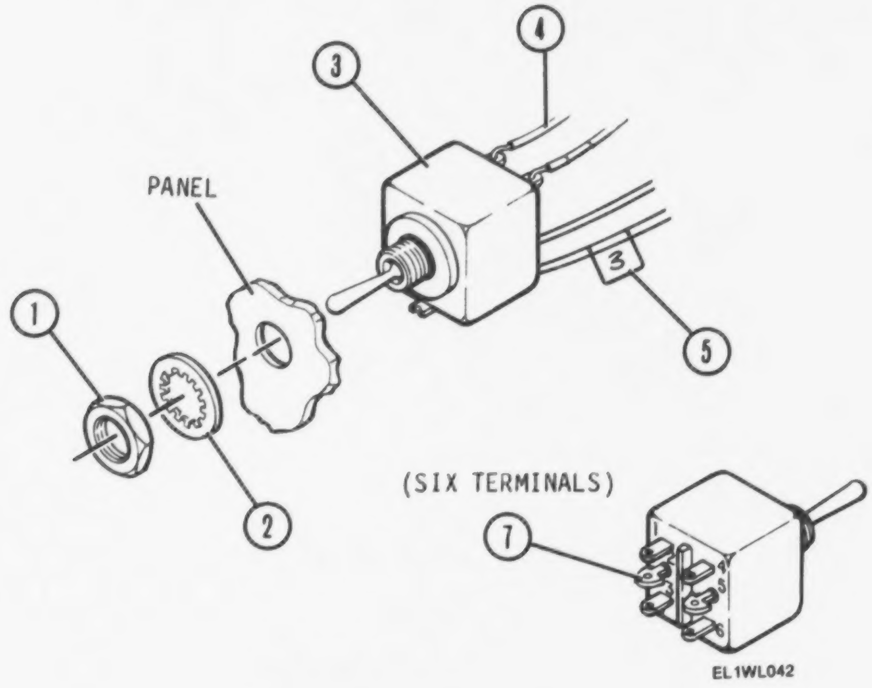
REPLACEMENT

NOTE

Before installation of new switch, verify its performance by performing the Operator Controls and Indicators Troubleshooting Procedures. (See paragraph 2-6.)

1 Prepare replacement switch ③ for installation by removing nut ① and star washer ②.

2-12. REMOVAL AND REPLACEMENT OF RMT PWR OUT ON/OFF SWITCH PROCEDURE—Continued



2 Solder all wires ④ to replacement switch ③, making sure to attach wires to correct switch terminals ⑦ and remove tags ⑤.

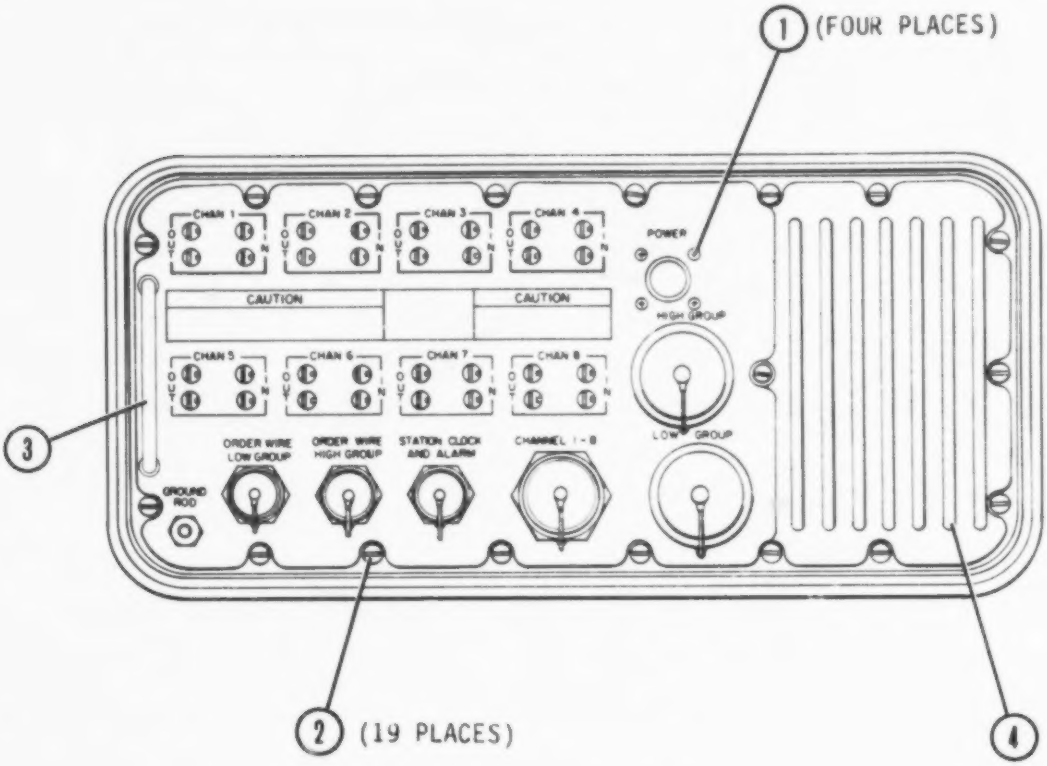
3 Insert replacement switch ③, with notch on bottom, through rear of front panel.

4 Using 5/16-inch socket wrench, secure switch ③ to front panel with star washer hex nut ①.

5 Replace power supply CCAs. (See TM 11-5805-707-12, paragraph 4-16.)

6 Replace power supply CCA compartment cover. (See TM 11-5805-707-12, paragraph 4-15.)

2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PROCEDURE


① (FOUR PLACES)
CHAN 1
CHAN 2
CHAN 3
CHAN 4
OUT
IN
POWER
CAUTION
CAUTION
HIGH GROUP
CHAN 5
CHAN 6
CHAN 7
CHAN 8
③
ORDER WIRE LOW GROUP
ORDER WIRE HIGH GROUP
STATION CLOCK AND ALARM
CHANNEL 1-8
LOW GROUP
GROUND ROD
② (19 PLACES)
④

EL1WL043

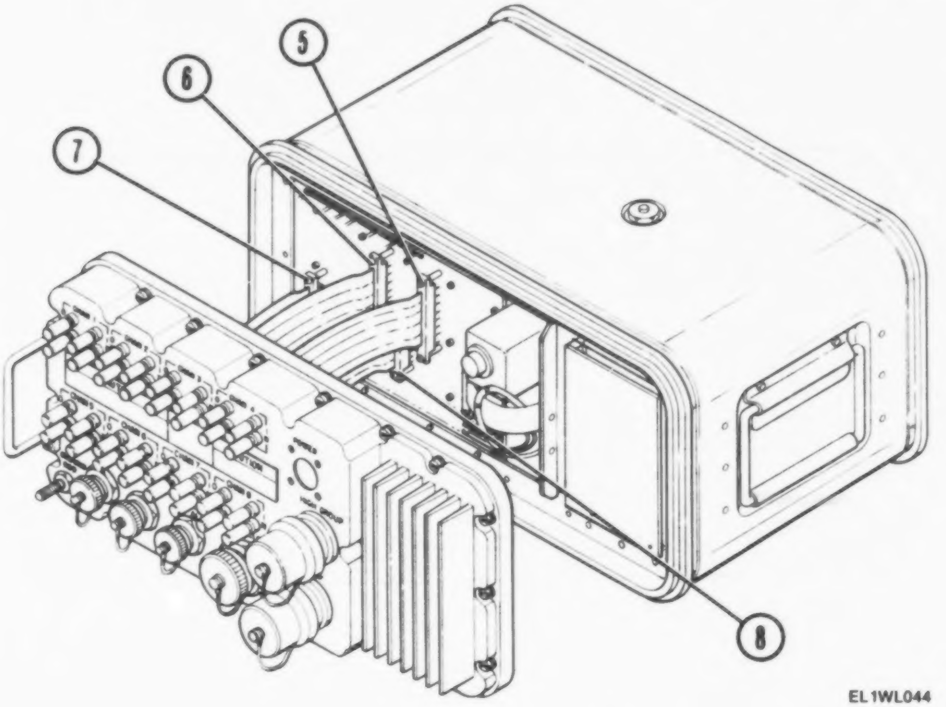
REMOVAL

1 Using No. 1 Phillips screwdriver, remove four screws ① fastening rear cover assembly to EMI filter.

2 Using 3/8 x 8-inch flat blade screwdriver, loosen 19 captive screws ② on rear cover assembly.

3 Grasp left support ③ and right cooling fins ④ and, while carefully pulling straight out, unseat and remove the rear cover assembly.

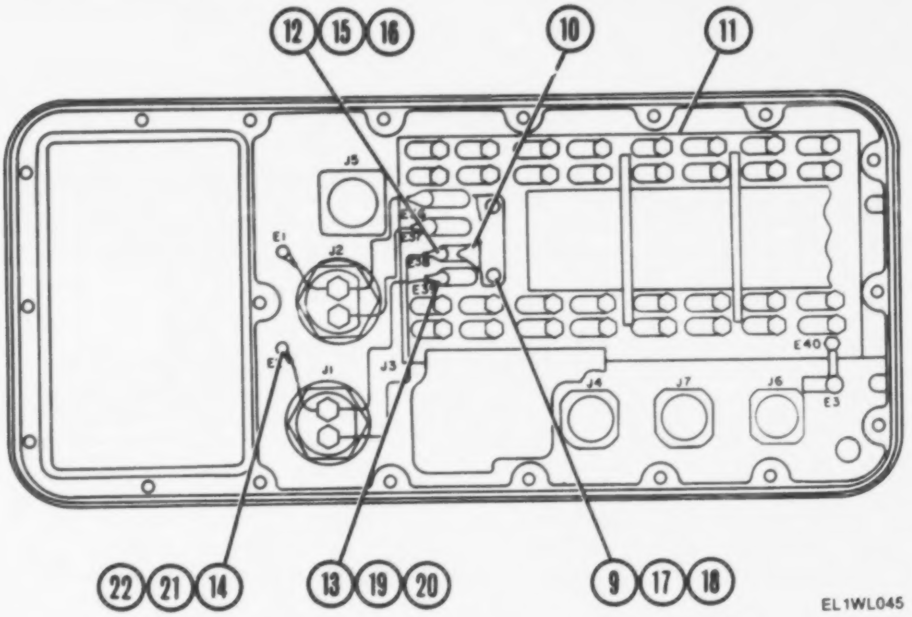
2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PROCEDURE—Continued



EL1WL044

4 Using No. 1 Phillips screwdriver, remove two machine screws, lockwashers, and flat washers at each of plugs P8 ⑤, P9 ⑥, P10 ⑦, and P11 ⑧. Disconnect plugs P8, P9, P10, and P11.

2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY
PROCEDURE—Continued



5 Using No. 1 Phillips screwdriver, remove three screws ⑨, flat washers ⑰, and lock washers ⑱ fastening protective cover ⑩ to surge arrestor pc board ⑪.

6 Using 1/4-inch socket wrench, remove nut ⑮ and flat washer ⑯ from connection point E38 ⑫. Lift wire connecting rear cover assembly to RMC backplane and tag "E38." Reinstall flat washer ⑮ and nut ⑯ finger tight to prevent loss.

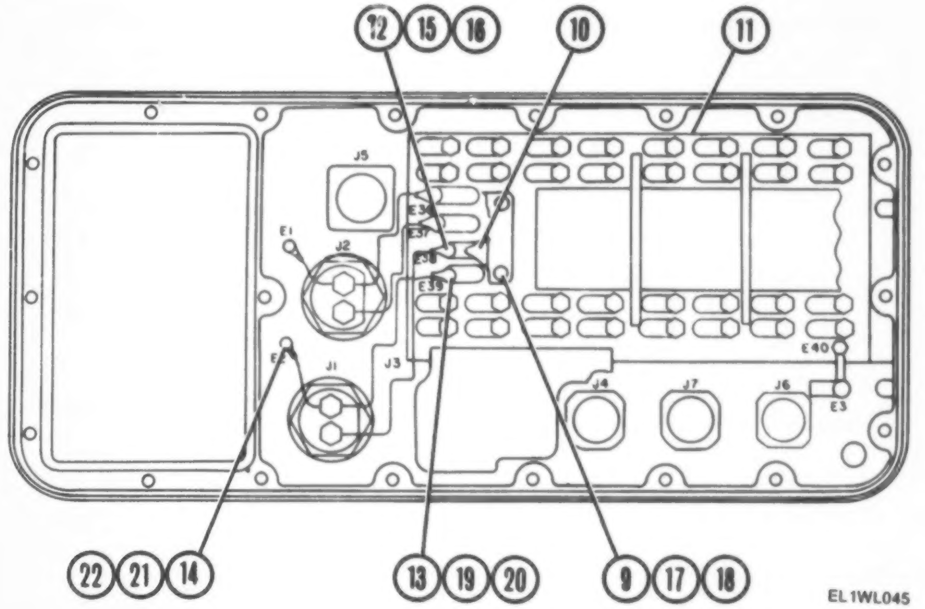
7 Using 1/4-inch socket wrench, remove nut ⑲ and flat washer ⑳ from connection point E39 ⑬. Lift wire connecting rear cover assembly to RMC backplane and tag "E39." Reinstall flat washer ⑳ and nut ⑲ finger tight to prevent loss.

8 Using No. 1 Phillips screwdriver, remove machine screw ㉑ and flat washer ㉒ at connection point E2 ⑭. Lift two wires connecting rear cover assembly to RMC backplane and tag "E2." Reinstall flat washer ㉒ and screw ㉑ to prevent loss.

9 Using No. 1 Phillips screwdriver, reinstall protective cover ⑩, using three lock washers ⑱, flat washers ⑰, and machine screws ⑨.

2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PROCEDURE—Continued

REPLACEMENT



EL1WL045

1 Using No. 1 Phillips screwdriver, remove three screws ⑨, flat washers ⑰, and lock washers ⑱, fastening protective cover ⑩ to surge arrestor pc board ⑪.

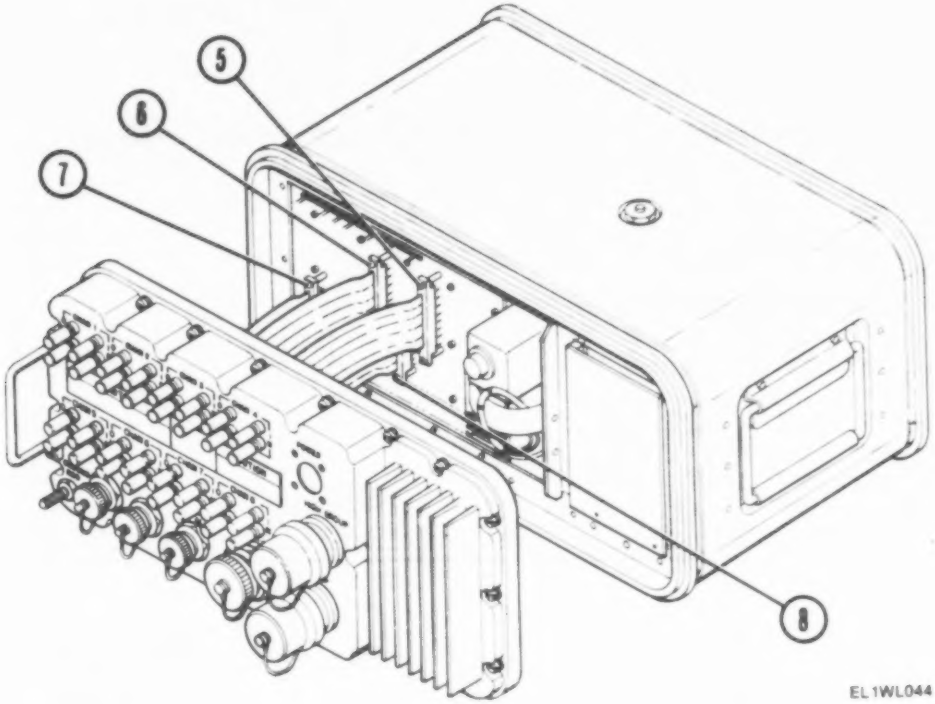
2 Using 1/4-inch socket wrench, remove nut ⑮ and flat washer ⑯ from connection point E38 ⑫. Install wire tagged "E38" from RMC backplane. Reinstall flat washer ⑯ and nut ⑮, but do not overtighten.

3 Using 1/4-inch socket wrench, remove nut ⑲ and flat washer ⑳ from connection point E39 ⑬. Install wire tagged "E39" from RMC backplane. Reinstall flat washer ⑳ and nut ⑲, but do not overtighten.

4 Using No. 1 Phillips screwdriver, remove machine screw ㉑ and flat washer ㉒ at connection point E2 ⑭. Install two wires tagged "E2" from RMC backplane. Reinstall flat washer ㉒ machine screw ㉑, but do not overtighten.

5 Using No. 1 Phillips screwdriver, reinstall protective cover ⑩, using three lock washers ⑱, flat washers ⑰, and machine screws ⑨. Do not overtighten.

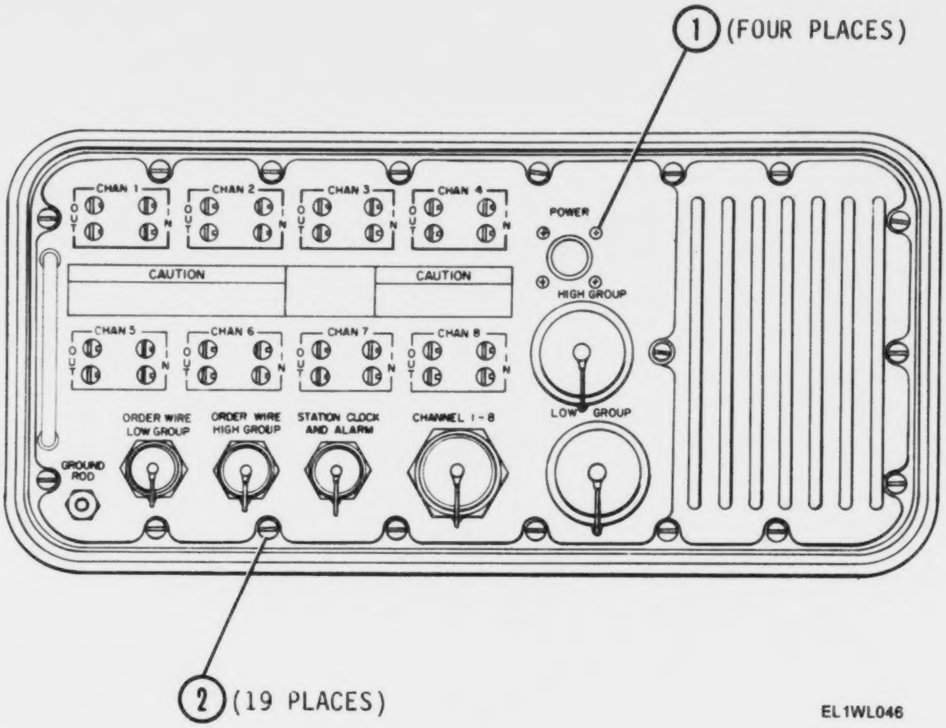
2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PROCEDURE —Continued



6 Using No. 1 Phillips screwdriver, connect plugs P8 ⑤, P9 ⑥, P10 ⑦, and P11 ⑧ to RMC backplane. Install two machine screws, lockwashers, and flat washers at each plug; tighten, but do not overtighten.

7 Position replacement rear cover assembly carefully into opening and press into place.

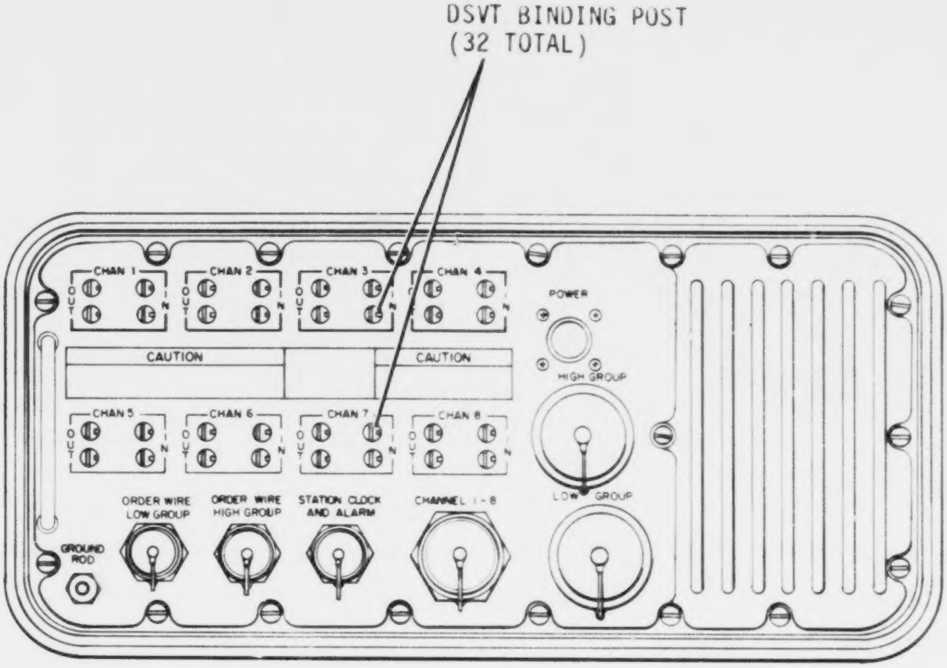
2-13. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PROCEDURE —Continued


① (FOUR PLACES)
CHAN 1
CHAN 2
CHAN 3
CHAN 4
OUT
IN
POWER
CAUTION
CAUTION
HIGH GROUP
CHAN 5
CHAN 6
CHAN 7
CHAN 8
LOW GROUP
ORDER WIRE LOW GROUP
ORDER WIRE HIGH GROUP
STATION CLOCK AND ALARM
CHANNEL 1-8
GROUND ROD
② (19 PLACES)
EL1WL046

8 Using 3/8 x 8-inch flat blade screwdriver, tighten 19 captive screws ② on rear cover assembly. Do not overtighten.

9 Using No. 1 Phillips screwdriver, install four screws ① fastening rear cover assembly to EMI filter. Do not overtighten.

2-14. REMOVAL AND REPLACEMENT OF DSVT BINDING POSTS PROCEDURE


DSVT BINDING POST
(32 TOTAL)
CHAN 1
CHAN 2
CHAN 3
CHAN 4
OUT
IN
CAUTION
CAUTION
POWER
HIGH GROUP
CHAN 5
CHAN 6
CHAN 7
CHAN 8
LOW GROUP
ORDER WIRE LOW GROUP
ORDER WIRE HIGH GROUP
STATION CLOCK AND ALARM
CHANNEL 1 - 8
GROUND ROD

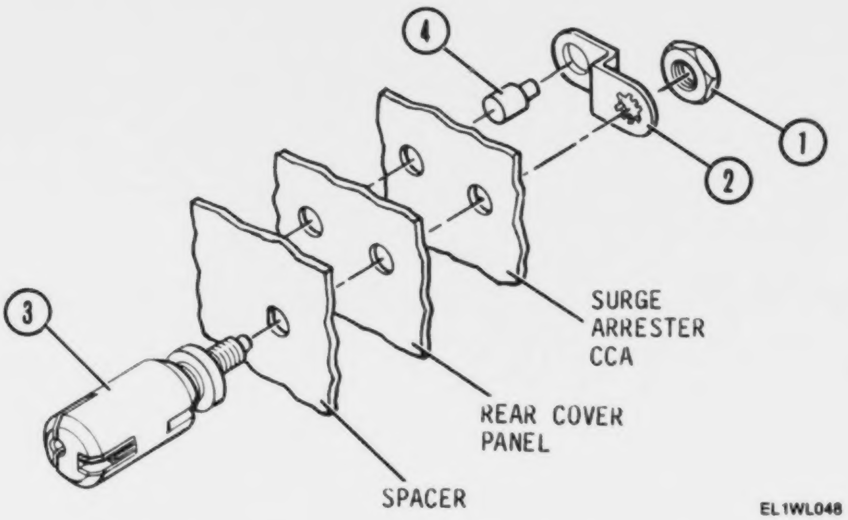
EL1WL047

PRELIMINARY PROCEDURE

- Remove rear cover assembly. (See paragraph 2-13.)

best copy available

2-14. REMOVAL AND REPLACEMENT OF DSVT BINDING POSTS PROCEDURE —Continued



REMOVAL

1 Using 11/32-inch socket wrench, remove lock nut ①, surge arrester retaining clip ②, and surge arrester ④ at inside of rear cover assembly.

2 Remove binding post ③ at outside of rear cover assembly.

REPLACEMENT

1 Prepare replacement binding post by removing lock nut ①.

2 Insert binding post ③ into outside of rear cover assembly.

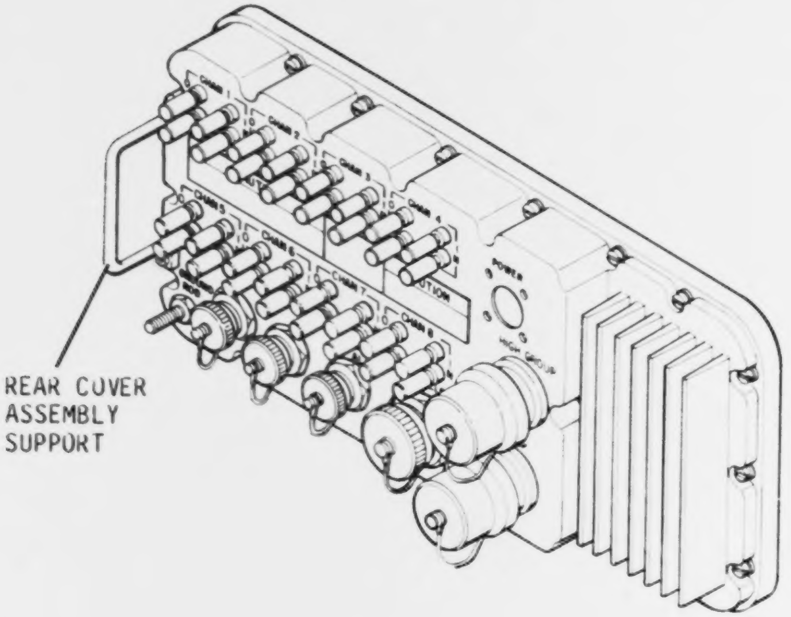
3 Install surge arrester ④, surge arrester retaining clip ②, and lock nut ①. Tighten lock nut, but do not overtighten.

NOTE

Before installing rear cover assembly, verify DSVT repair by performing Rear Cover Assembly Troubleshooting Procedures. (See paragraph 2-5.)

4 Replace rear cover assembly. (See paragraph 2-13.)

2-15. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY SUPPORT PROCEDURE

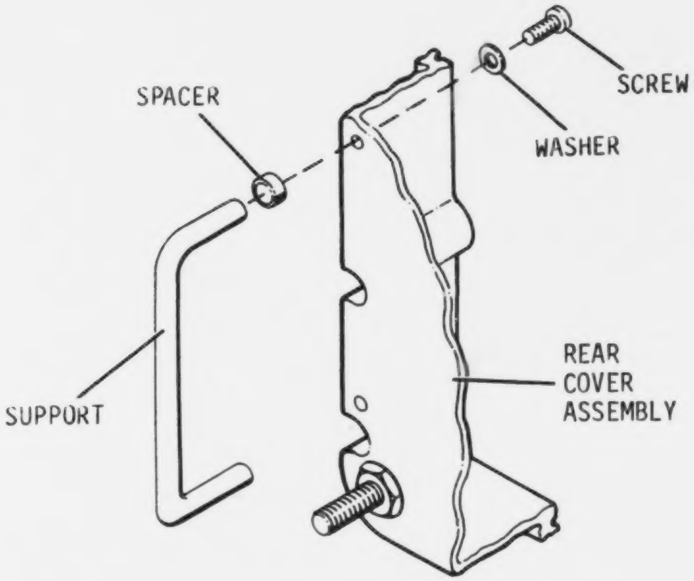

REAR COVER
ASSEMBLY
SUPPORT

EL1WL049

PRELIMINARY PROCEDURE

1 Remove rear connector panel assembly. (See paragraph 2-13.)

2-15. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY SUPPORT PROCEDURE—Continued


SPACER
SCREW
WASHER
SUPPORT
REAR COVER ASSEMBLY

EL1WL050

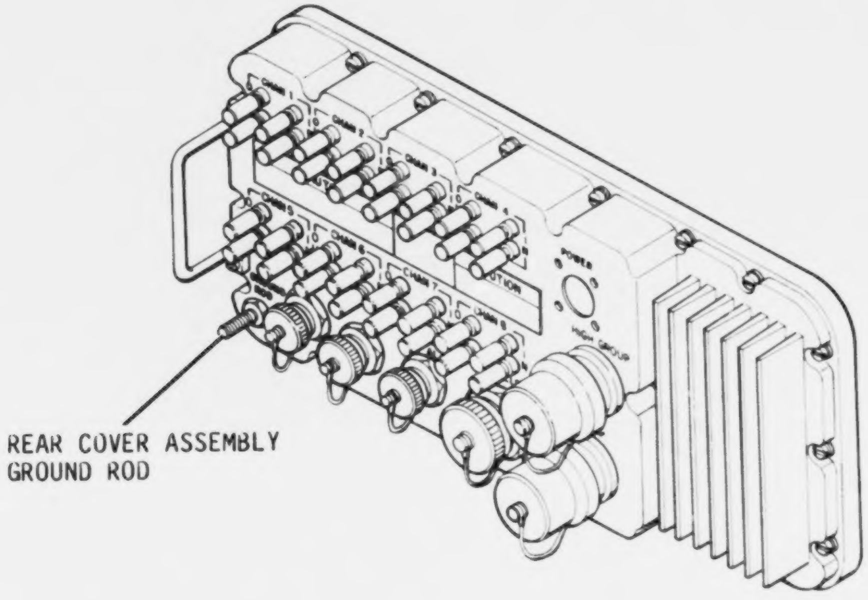
2 Using No. 2 Phillips screwdriver, remove screws and washers securing support to rear cover assembly.

REPLACEMENT

1 Position replacement support on rear cover assembly and secure, using Phillips head screws and washers.

2 Carefully replace rear cover assembly. (See paragraph 2-13.)

2-16. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY GROUND ROD PROCEDURE

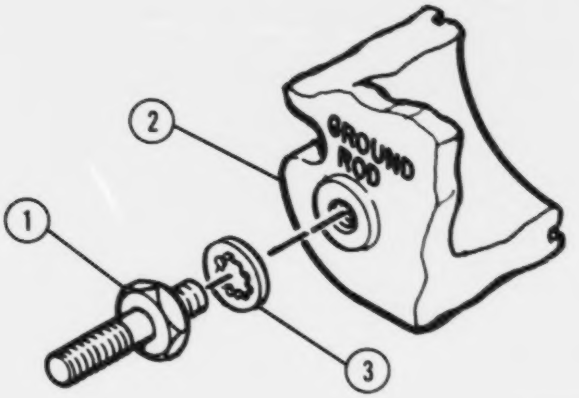

CHAN 1
CHAN 2
CHAN 3
CHAN 4
CHAN 5
CHAN 6
CHAN 7
CHAN 8
POWER
HIGH GROUP
REAR COVER ASSEMBLY
GROUND ROD

EL1WL051

REMOVAL

1 Using 9/16-inch open-end wrench, unscrew ground terminal ① from rear cover assembly ②. Retain star washer ③.

2-16. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY GROUND ROD PROCEDURE—Continued



EL1WL052

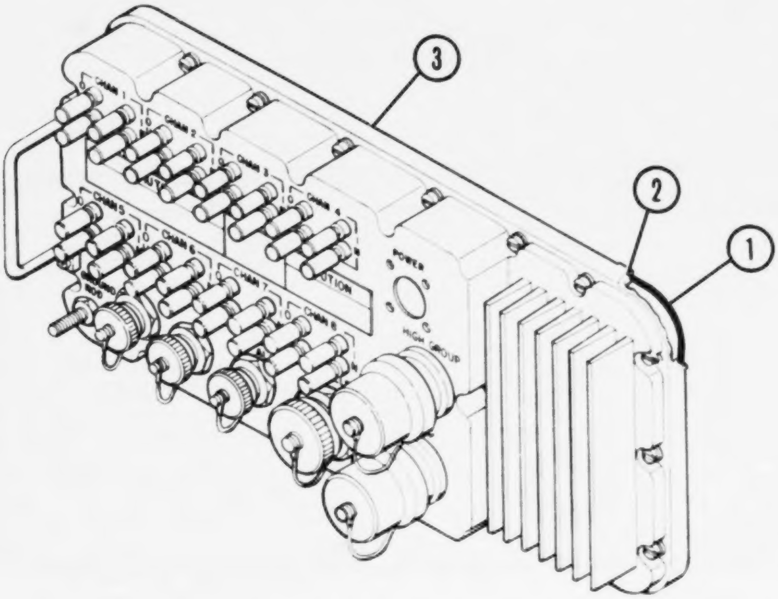
2 Apply primer and sealing compound to shorter threaded end of terminal ①.

REPLACEMENT

1 To replace ground rod assembly, install star washer ③ over shorter end of terminal.

2 Screw shorter of end of terminal ① with star washer ③ attached into threaded hole on rear cover assembly ②. Tighten with 9/16-inch open-end wrench, but do not overtighten.

2-17. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY PANEL GASKET PROCEDURE


③
②
①
CHAN 1
CHAN 2
CHAN 3
CHAN 4
CHAN 5
CHAN 6
CHAN 7
CHAN 8
POWER
HIGH GROUP

EL1WL053

PRELIMINARY PROCEDURE

- Remove rear cover assembly. (See paragraph 2-13.)

REMOVAL

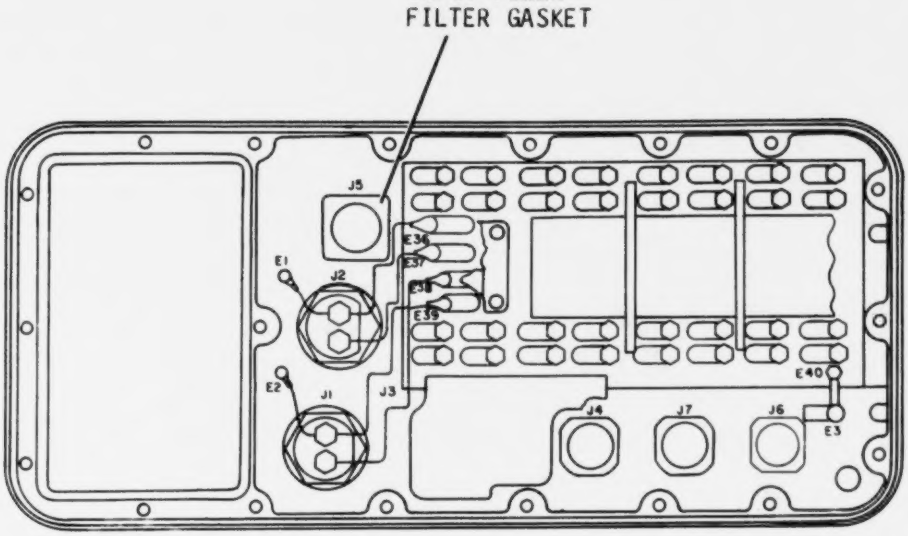
- Remove O-ring panel gasket ① from slot ② extending around circumference of inside surface of rear cover assembly ③.

REPLACEMENT

1 Press new O-ring ① into slot ②.

2 Replace rear cover assembly ③. (See paragraph 2-13.)

2-18. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY INPUT POWER FILTER GASKET PROCEDURE

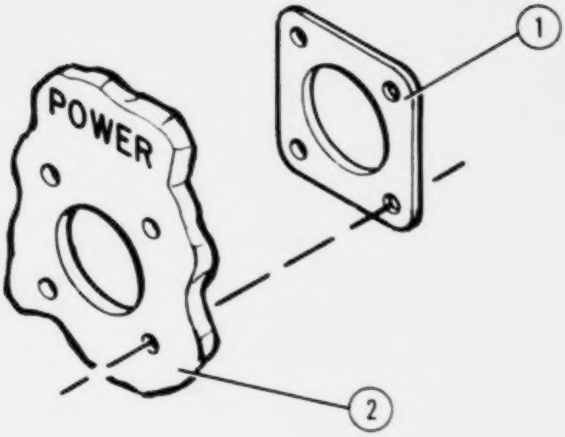

INPUT POWER FILTER GASKET
J5
E1
J2
E36
E37
E38
E39
E2
J1
J3
J4
J7
J6
E40
E3

EL1WL054

PRELIMINARY PROCEDURE

- Remove rear cover assembly in accordance with paragraph 2-13. Note that plugs P8, P9, P10, and P11 need not to be disconnected to replace input power filter gasket.

2-18. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY INPUT POWER FILTER GASKET PROCEDURE—Continued



EL1WL055

REMOVAL

- Using flat blade screwdriver, carefully scrape old gasket ① away from rear cover assembly input power filter gasket surface ②. Remove all existing material and adhesive, taking care not to damage the rear cover assembly metal surface.

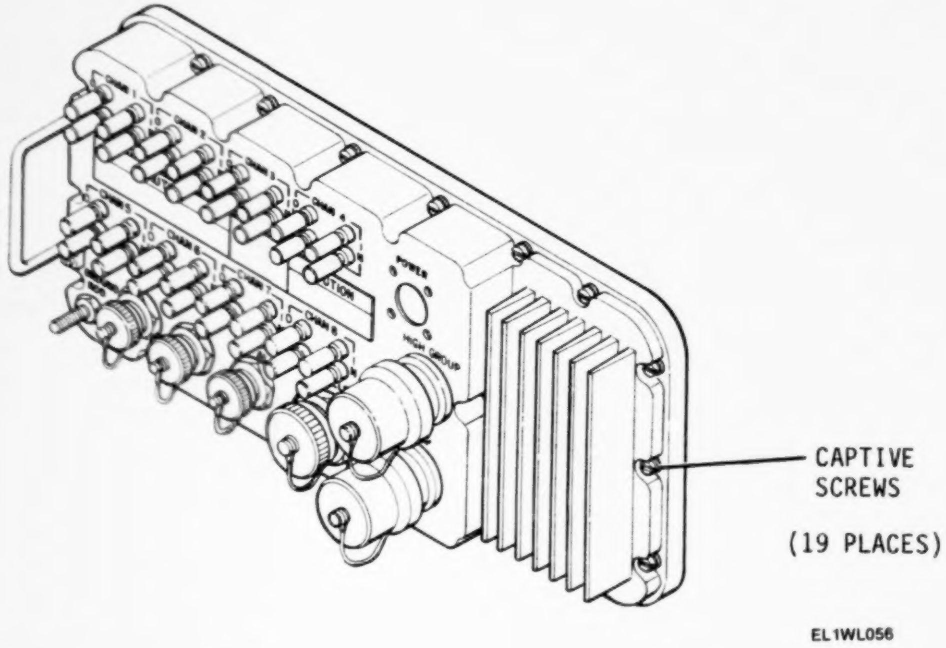
REPLACEMENT

1 Apply a thin coat of gasket adhesive to one surface of replacement gasket ①.

2 Press replacement gasket ① into place on rear cover assembly gasket surface ②. Allow 15 minutes adhesive cure time.

3 Replace rear cover assembly. (See paragraph 2-13.)

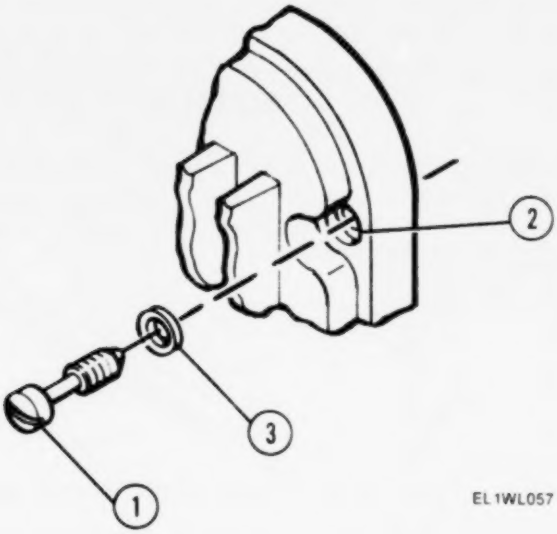
2-19. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY CAPTIVE SCREWS PROCEDURE


CAPTIVE SCREWS
(19 PLACES)
EL1WL056

PRELIMINARY PROCEDURE

- Remove rear cover assembly. (See paragraph 2-13.) Note that plugs P8, P9, P10, and P11 do not need to be disconnected to replace captive screws.

2-19. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY CAPTIVE SCREWS PROCEDURE—Continued



REMOVAL

NOTE

> If screw head is damaged such that screw cannot be unscrewed from assembled RMC, forward RMC to next higher maintenance level.

- Damaged screw head:

  Grasp head of screw ①, pull out until engaged in rear cover assembly threaded hole ②, and turn counterclockwise until screw comes loose from rear cover assembly. Retain old flat washer ③.

- Lightly damaged screw threads:

  Using 1/4 x 4-inch flat blade screwdriver, unscrew captive screw ① from rear cover assembly threaded hole ② using short, back-and-forth unscrewing movements.

2-19. REMOVAL AND REPLACEMENT OF REAR COVER ASSEMBLY CAPTIVE SCREWS PROCEDURE—Continued

CAUTION

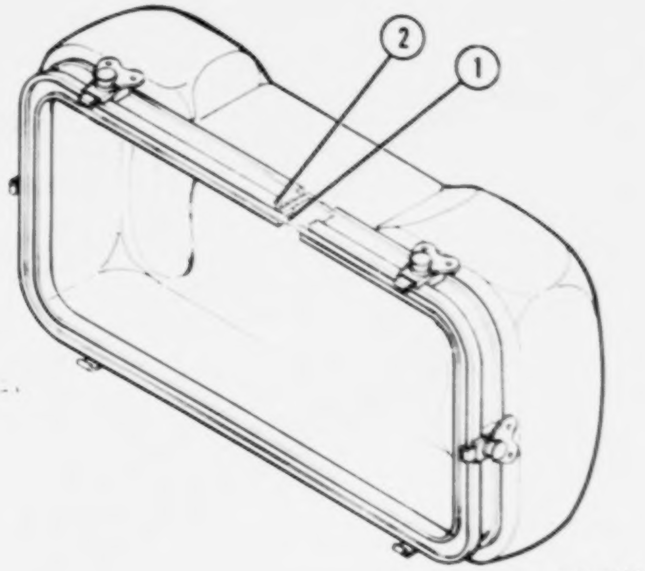
If captive screw resists removal with moderate pressure applied, complete rear cover assembly removal according to paragraph 2-13, and forward rear cover assembly to next higher maintenance level.

REPLACEMENT

1 Using 1/4 x 4-inch flat blade screwdriver, insert new captive screw ① and flat washer ③ into rear cover assembly threaded hole ②.

2 Replace rear cover assembly. (See paragraph 2-13.)

2-20. REMOVAL AND REPLACEMENT OF TRANSPORT COVER GASKET PROCEDURE



NOTE

O-ring gaskets and removal and replacement procedures are identical for front and rear covers.

PRELIMINARY PROCEDURE

- Unlatch and remove transport cover(s) from RMC, if fastened.

REMOVAL

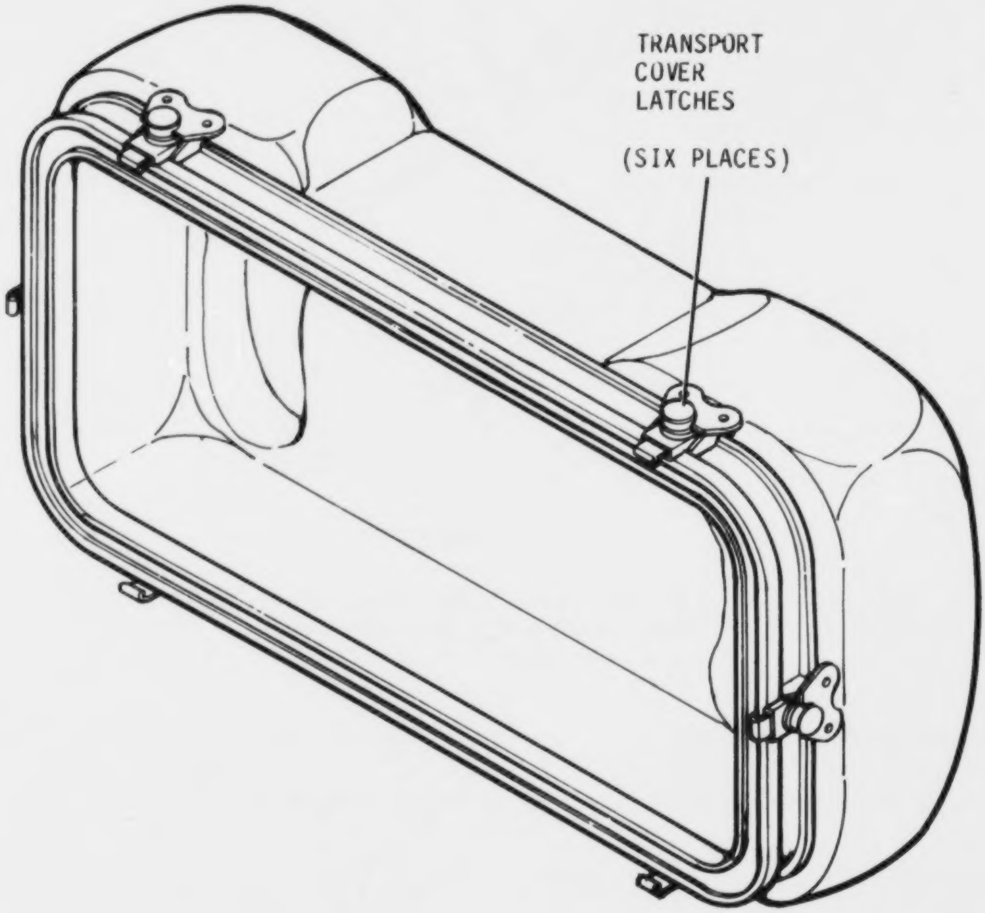
- Pull existing O-ring ① from transport cover slot ② extending around circumference of transport cover.

REPLACEMENT

1 Press new O-ring ① into slot ②.

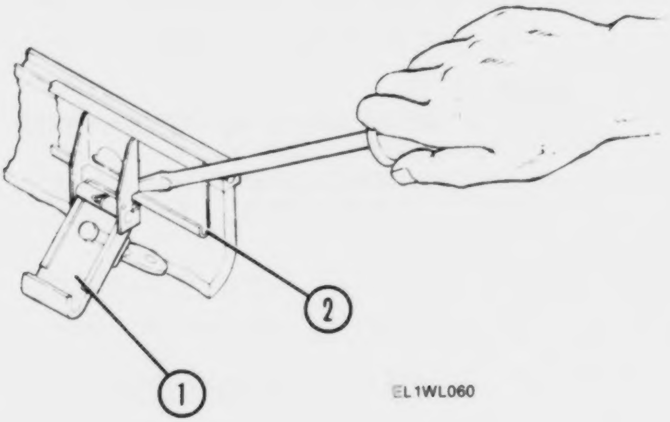
2 Transport cover may now be fastened to RMC.

2-21. REMOVAL AND REPLACEMENT OF TRANSPORT COVER LATCHES PROCEDURE

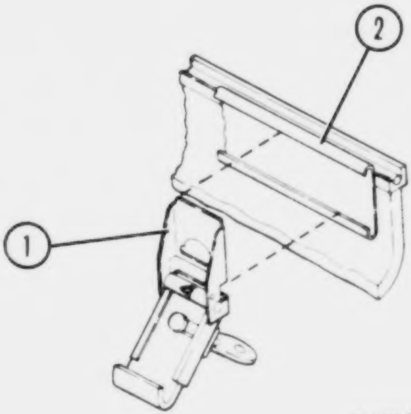

TRANSPORT COVER LATCHES
(SIX PLACES)

EL1WL059

2-21. REMOVAL AND REPLACEMENT OF TRANSPORT COVER LATCHES PROCEDURE —Continued



EL1WL060



EL1WL061

REMOVAL

1 Using 3/8 x 8-inch flat blade screwdriver, work screwdriver between inner surface of latch ① and transport cover closure band ② at hinge side of latch.

2 With a quick prying motion, snap latch ① free from transport cover closure band ②.

NOTE

Snapping the latch free may cause a slight nick in the transport cover closure band.

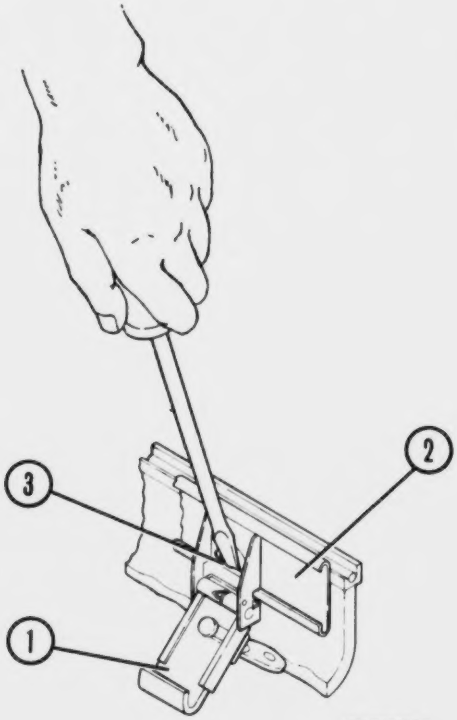
2-21. REMOVAL AND REPLACEMENT OF TRANSPORT COVER LATCHES PROCEDURE —Continued

REPLACEMENT

1 Insert latch ① into desired position at transport cover closure band ②.

NOTE

If nicking of the transport cover closure band occurred during latch removal, position replacement latch slightly to the side of the nick.



EL1WL062

2 Position 3/8 x 8-inch flat blade screwdriver at latch expansion plate ③ and with a quick, hammering motion, fasten latch ① onto transport cover closure band ②.

Section IV. TESTING

2-22. HOW TO USE THE PROCEDURES

The following procedural steps must be performed in sequence indicated. Switch settings are to remain in position last used unless otherwise directed.

2-23. EXPLANATION OF TABULAR DATA

a. Step Column. This column indicates sequence in which the procedure is to be performed.

b. Procedure Column. This column provides initial setup procedure and the detailed steps of the test procedure.

c. Observation Column. This column indicates the events or indications which determine whether a test can be considered passed or failed. Any indications on the test equipment or unit under test which are not specified in the Observation column are to be ignored.

d. Action Column. This column provides instructions to correct faults, or it refers the technician to a specific flowchart contained in this section of the manual. In most cases, the fault can be corrected by replacing a circuit card assembly. If the fault is corrected, the flowchart will instruct the technician to perform the next applicable step in the test sequence. A note on the flowchart indicates the step of procedure at which the tests should resume. If the test continues to fail, however, the fault is possibly in the wiring or other assembly within the unit. If this occurs, the unit must be returned to depot for repair.

2-24. TESTING THE UNIT

Prior to testing the unit, refer to TM 11-5805-707-12, Chapter 1 to insure that the unit has all circuit card assemblies (CCA) installed in the correct locations. Record all switch positions and CCA locations. Be sure to return them to original positions after completion of testing.

The following procedures require the unit to be turned on and operating in an off-line mode. If, during the testing, a CCA or Direct Support replaceable component is found defective, replace the item in accordance with TM 11-5805-707-12, Chapter 4, or Chapter 2 of this manual.

2-24. TESTING THE UNIT—Continued

The RLGM may contain LP MDM CCAs, AAU CCAs or combinations of both CCAs. For RLGMs without AAU CCAs, do not perform step 11. For RLGMs without LP MDM CCAs, do not perform steps 14 and 15. Be sure to check all AAU CCAs before checking LP MDM CCAs.

2-25. TEST OBJECTIVES

Verify faults reported by Organizational Maintenance by checking BITE alarms, and by performing abbreviated operational tests. Interpret BITE indications and identify a faulty unit or a faulty component. Determine if unit is to be returned to Depot for repair.

2-26. TEST CABLES REQUIRED

Cable	Quantity
Power	1
RMC Test Harness (Part No. G285559-1)	1

2-27. TEST EQUIPMENT REQUIRED

All test equipment and test equipment controls and indicators used in the performance of the tests are listed below and shown in the following illustrations. Controls and indicators not used during testing are not identified. For complete operating instructions for the test equipment, refer to the appropriate test equipment instruction manual.

a. BITE Capability (internal to unit). Is provided on unit monitor circuits, and illuminates LEDs to idicate a faulty CCA.

b. SG-1139( )/G Digital Data Generator. Provides conditioned diphase signals and error detection to activate BITE circuts and for transmission check of unit.

c. External 180 V Power Source or RLGM/CD.

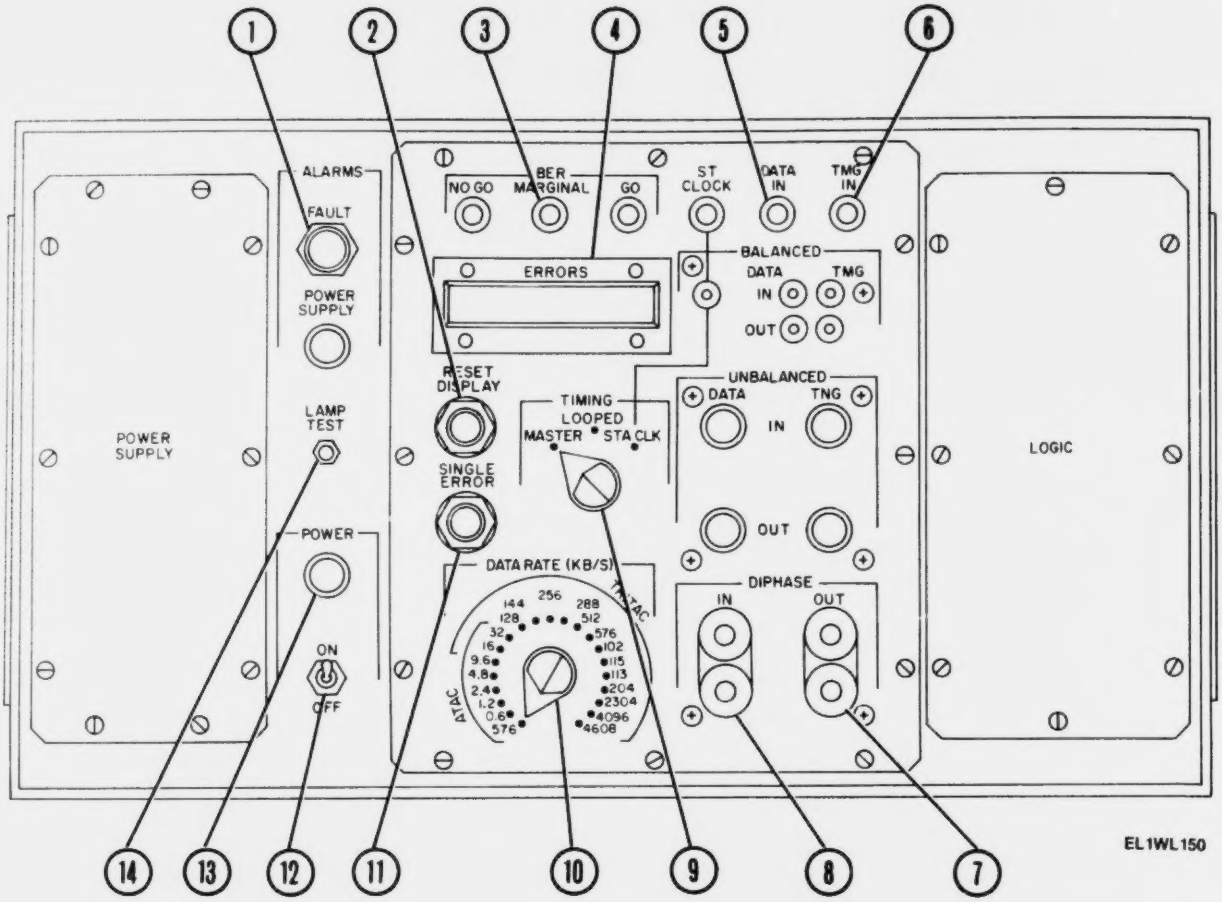
2-27. TEST EQUIPMENT REQUIRED—Continued

d. AN/PSM-45 Digital Multimeter. Checks opening/closure of alarm circuits and continuity of wiring, connectors, switches, and lamp circuits.

e. HP-3551A Transmission Test Set. Provides analog sine wave signals and an ac voltmeter to check any AAU CCAs that may be in this unit.

2-27. TEST EQUIPMENT REQUIRED—Continued

SG-1139( )/G DIGITAL DATA GENERATOR


①
②
③
④
⑤
⑥
ALARMS
FAULT
POWER SUPPLY
LAMP TEST
POWER
ON
OFF
POWER SUPPLY
BER
NO GO
MARGINAL
GO
ERRORS
RESET DISPLAY
SINGLE ERROR
TIMING
LOOPED
MASTER
STA CLK
DATA RATE (KB/S)
TACTAC
ATAC
144
256
288
128
512
32
576
16
102
9.6
115
4.8
113
2.4
204
1.2
2304
0.6
4096
576
4608
ST CLOCK
DATA IN
TMG IN
BALANCED
DATA
TMG
IN
OUT
UNBALANCED
DATA
TNG
IN
OUT
DIPHASE
IN
OUT
LOGIC
EL1WL150
⑭
⑬
⑫
⑪
⑩
⑨
⑧
⑦

① ALARMS FAULT indicator

② RESET DISPLAY pushbutton

③ BER-NOGO/MARGINAL/GO indicators

④ ERRORS display

⑤ DATA IN indicator

⑥ TMG IN indicator

⑦ DIPHASE OUT double banana jack

⑧ DIPHASE IN double banana jack

⑨ TIMING three-position rotary switch

⑩ DATA RATE (KB/S) 21-position rotary switch

⑪ SINGLE ERROR pushbutton switch

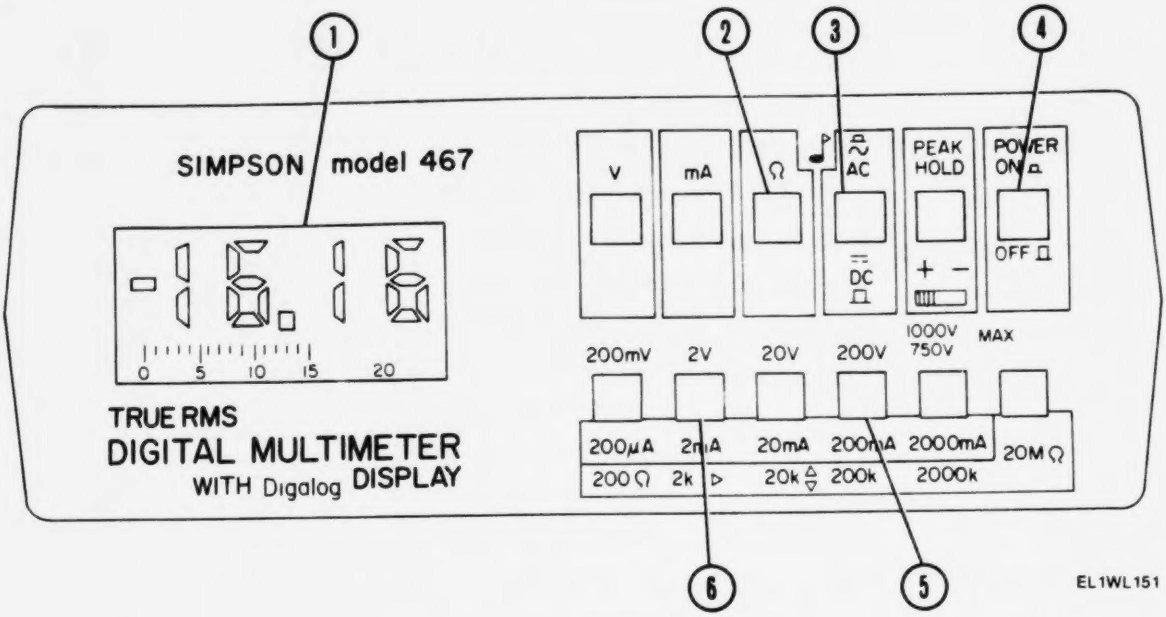
⑫ POWER ON/OFF toggle switch/circuit breaker

⑬ POWER indicator

⑭ LAMP TEST pushbutton switch

2-27. TEST EQUIPMENT REQUIRED—Continued

AN/PSM-45 DIGITAL MULTIMETER


①
②
③
④
SIMPSON model 467
-16.16
0 5 10 15 20
TRUE RMS
DIGITAL MULTIMETER
WITH Digalog DISPLAY
V
mA
Ω
AC
DC
PEAK HOLD
+ −
POWER ON
OFF
200mV
2V
20V
200V
1000V 750V
MAX
200µA
2mA
20mA
200mA
2000mA
20MΩ
200Ω
2k
20k
200k
2000k
⑥
⑤
EL1WL151

① Digalog DISPLAY display

② Ω pushbutton

③ AC/DC pushbutton

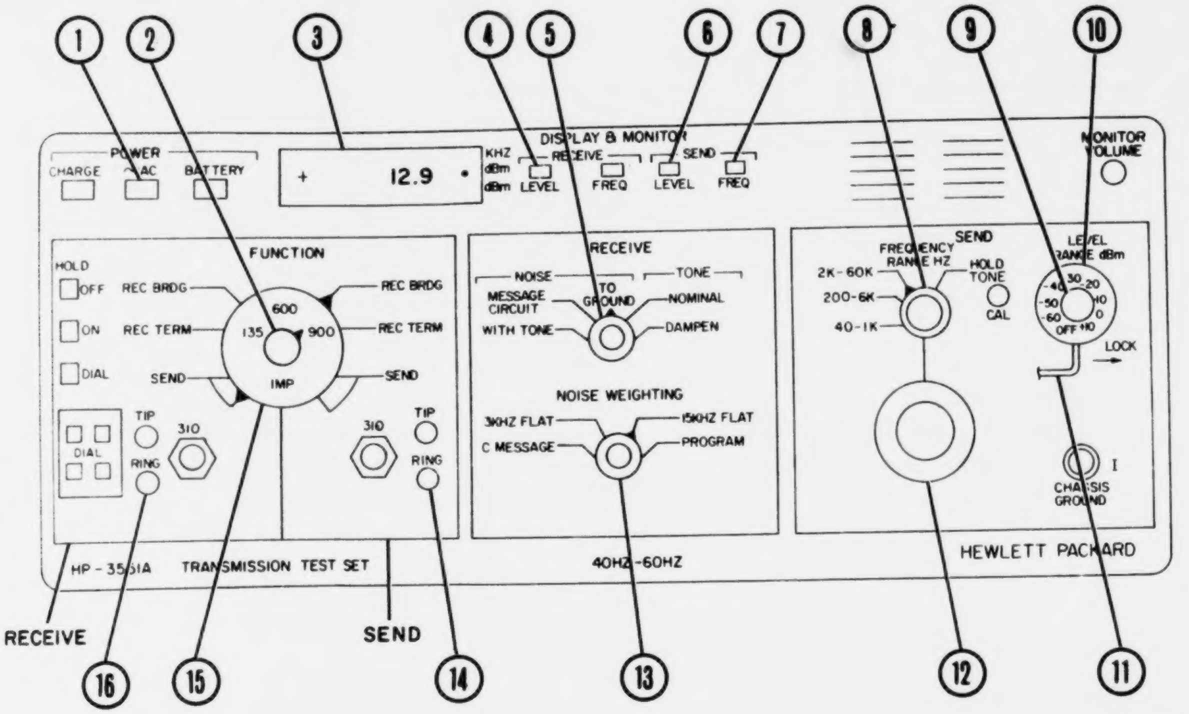
④ POWER ON/OFF pushbutton

⑤ 200V/200mA/200k pushbutton

⑥ 2V/2mA/2k pushbutton

2-27. TEST EQUIPMENT REQUIRED—Continued

HP-3551A TRANSMISSION TEST SET



①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
POWER
CHARGE
~AC
BATTERY
+ 12.9 •
KHZ
dBm
dBm
DISPLAY & MONITOR
RECEIVE
LEVEL
FREQ
SEND
LEVEL
FREQ
MONITOR VOLUME
HOLD
OFF
ON
DIAL
FUNCTION
REC BRDG
REC TERM
SEND
600
135
900
IMP
REC BRDG
REC TERM
SEND
TIP
RING
310
DIAL
310
TIP
RING
RECEIVE
NOISE
TONE
MESSAGE CIRCUIT
TO GROUND
NOMINAL
WITH TONE
DAMPEN
NOISE WEIGHTING
3KHZ FLAT
15KHZ FLAT
C MESSAGE
PROGRAM
SEND
FREQUENCY RANGE HZ
2K-60K
200-6K
40-1K
HOLD TONE
CAL
LEVEL RANGE dBm
-40
30
20
-50
10
-60
0
OFF
+10
LOCK
CHASSIS GROUND
I
HP-3551A
TRANSMISSION TEST SET
40HZ-60HZ
HEWLETT PACKARD
RECEIVE
SEND
⑯
⑮
⑭
⑬
⑫
⑪

EL1WL152

① POWER AC pushbutton switch

② IMP rotary switch

③ Display

④ DISPLAY & MONITOR RECEIVE LEVEL pushbutton switch

⑤ RECEIVE rotary switch

⑥ DISPLAY & MONITOR SEND LEVEL pushbutton switch

⑦ DISPLAY & MONITOR SEND FREQ pushbutton switch

⑧ SEND FREQUENCY RANGE HZ rotary switch

⑨ SEND LEVEL RANGE dBm vernier

⑩ SEND LEVEL RANGE dBm rotary switch

⑪ SEND LEVEL RANGE dBm LOCK lever

⑫ SEND LEVEL FREQUENCY HZ vernier

⑬ RECEIVE NOISE WEIGHTING rotary switch

⑭ FUNCTION TIP/RING banana jacks

⑮ FUNCTION rotary switch

⑯ FUNCTION TIP/RING banana jack

2-28. TEST SEQUENCE

Step No.	Procedure Title
1	Test Equipment Interconnection and Setup
2	Test Equipment Initialization
3	UUT Preliminary Switch Settings
4	UUT Input Power Circuits Test
5	Front Panel Alarm Lamps Test
6	Power Supply Circuits Test
7	+28 V dc Source
8	Logic Assembly Fault LED Test
9	BITE and Alarm Test
10	SA-Alarm Test
11	S-Alarm Test
12	AAU Circuits Test
13	Maint OW Output (AVOW) Operational Check
14	Loop Modem Power Feed Test
15	LP MDM Digital Errors Test
16	Remote Power Test

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
1.	TEST EQUIPMENT INTERCONNECTION and SETUP Refer to test setup diagram (fig FO-12A) and preceding test equipment illustrations, and connect cables as follows: a. Connect bench ground to unit under test (UUT) ground (E1) and to bench GND. b. Connect power between UUT connector J5 (POWER) and 115 V ac source using power cable. c. Connect ALARM cable (P1) to UUT STA CLK & ALARM (J4). d. Connect ALARM SA cables to PSM-45 + (P12) and - (P11). e. Connect OW cable (P2) to UUT ORDERWIRE LOW GROUP (J6). f. AN/PSM-45 (battery operated) - no power connections required. g. Connect LOAD BOX cable (P19) to power feed/load adapter box (J1). h. Connect load box GND to UUT GND. i. Connect LOOP cable (P17) to UUT HIGH GROUP (J2). j. SG-1139 ( )/G Digital Data Generator - connect power cable to 115 V ac power source.		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
1. (Cont)	k. HP-3551A Transmission Test Set - connect power cable to 115 V ac power source. l. Remove logic assembly cover and determine first AAU channel (if any) by referring to the following Configuration Audit.		

Configuration Audit

Field Wire Post Conns	Ref CCA	LP MDM Edge Switches	AAU Edge Switches	AAU Internal DIP Switches	
CHAN 1 o o OUT IN o o	A6	PWR FD ON-OFF (S1) -TOP-	TRF NORM-LOOP (S1)	XMT GAIN (S3)	RCV GAIN (S5)
CHAN 2 o o OUT IN o o	A6	PWR FD ON-OFF (S2) -BOTTOM-	TRF NORM-LOOP (S2)	XMT GAIN (S4)	RCV GAIN (S6)
CHAN 3 o o OUT IN o o	A7	PWR FD ON-OFF (S1) -TOP-	TRF NORM-LOOP (S1)	XMT GAIN (S3)	RCV GAIN (S5)
CHAN 4 o o OUT IN o o	A7	PWR FD ON-OFF (S2) -BOTTOM-	TRF NORM-LOOP (S2)	XMT GAIN (S4)	RCV GAIN (S6)

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
1. (Cont)	Configuration Audit - Continued		

Field Wire Post Conns	Ref CCA	LP MDM Edge Switches	AAU Edge Switches	AAU Internal DIP Switches	
CHAN 5 o o OUT IN o o	A11	PWR FD ON-OFF (S1) -TOP-	TRF NORM-LOOP (S1)	XMT GAIN (S3)	RCV GAIN (S5)
CHAN 6 o o OUT IN o o	A11	PWR FD ON-OFF (S2) -BOTTOM-	TRF NORM-LOOP (S2)	XMT GAIN (S4)	RCV GAIN (S6)
CHAN 7 o o OUT IN o o	A12	PWR FD ON-OFF (S1) -TOP-	TRF NORM-LOOP (S1)	XMT GAIN (S3)	RCV GAIN (S5)
CHAN 8 o o OUT IN o o	A12	PWR FD ON-OFF (S2) -BOTTOM-	TRF NORM-LOOP (S2)	XMT GAIN (S4)	RCV GAIN (S6)

m. Connect CH1-8 IN (+) and (-) cables to first AAU channel CHAN IN field wire posts.

n. Connect CH1-8 OUT (+) and (-) cables to first AAU channel CHAN OUT fieldwire posts.

o. If UUT has no AAU CCAs, connect CH1-8 IN/OUT cables to CHAN 1 IN/OUT fieldwire posts, and omit step 12 of these procedures.

p. Connect GROUP cable (P15) to UUT GROUP (J3).

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
2.	TEST EQUIPMENT INITIALIZATION. Refer to test equipment illustrations. a. Set AN/PSM-45 digital multimeter switches as follows: POWER .... ON FUNCTION .... Ω RANGE .... 2 b. Set HP-3551A Transmission Test Set as follows: • Depress POWER ~ AC switch. • Select 600 on FUNCTION switch center knob. • Place SEND FREQUENCY RANGE switch to position 200-6K. • Press DISPLAY & MONITOR SEND FREQ switch. • Rotate SEND FREQ vernier to read .820 KHz on Display Monitor. • Press DISPLAY & MONITOR SEND LEVEL switch. • Rotate LEVEL RANGE selector to -10 through -20 dBm position. • Rotate SEND LEVEL vernier to read -17 dBm on Display Monitor. • Set SEND LEVEL LOCK to LOCK once -17 dBm is set.		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
2. (Cont)	**NOTE** Designate the right-hand set of banana jacks and FUNCTION switch as the REC section; the left-hand banana jacks and FUNCTION switch as the SEND section.		
	● Set Rec section FUNCTION switch to REC TERM.		
	● Set RECEIVE NOISE WEIGHTING switch to C MESSAGE.		
	● Press Display & Monitor RECEIVE LEVEL switch.		
	● Rotate RECEIVE switch to TONE-NORMAL.		
	c. Set SG-1139 Data Generator Set as follows:		
	● Set the TIMING selector switch to MASTER.		
	● Set the DATA RATE selector switch to the ATAC 32 position.		
	● Set POWER ON/OFF switch to ON.	SG-1139 POWER lamp lights green. SG-1139 FAULT lamp OFF.	
	● Press and hold LAMP TEST pushbutton.	Each of the seven LEDs on the ERRORS indicator light the numeral 8, and all lamps light.	If test fails, refer to SG-1139 Manual, TM 11-6625-3041-12.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
2. (Cont)	• Release LAMP TEST pushbutton.		
	• Use two BNC adapters and BNC cable from cable kit and connect DIPHASE IN to DIPHASE OUT.	DATA IN, BER GO, and TMG IN LEDs light green, and ERRORS indicator must be all zeros.	If test fails, refer to SG-1139 Manual, TM 11-6625-3041-12.
	• Push SINGLE ERROR pushbutton one time only.	ERRORS indicator must display 0000001.	
	• Disconnect BNC cable from DIPHASE IN and DIPHASE OUT.		
	• Press RESET DISPLAY.	Errors indicator must display all zeros.	
	• Set TIMING to LOOPED.		
3.	UUT PRELIMINARY SWITCH SETTINGS		
	a. Set POWER ON/OFF switch (S1) to OFF.		
	b. Set switches on all AAU CCAs as follows:		
	• Set both TRF switches on each AAU CCA installed to NORM (up).		
	• Remove each AAU CCA, setting the XMT GAIN and RCV GAIN (DIP) switches on odd (S4 and S6) and even (S3 and S5) numbered channels for each AAU CCA installed to 0 dB gain as follows:		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
3. (Cont)	1 - OFF (3 dB) 2 - ON (0 dB) 3 - OFF (10 dB) 4 - OFF (20 dB)		
	• Replace each AAU CCA.		
	c. Set switches on all LP MDM CCAs as follows:		
	• Set PWR FD toggle switch (2 per LP MDM) to OFF (down).		
	d. Set switches on balance of CCAs as follows:		
	• Set CHAN RATE toggle switch (TIM GEN-A15) to 32 (up).		
	• Set GP RATE thumbwheel switch (TIM GEN-A15) to 7.		
	• Set TMG switch (GROUP MDM) to MASTER position (up).		
	• Set LOW GP toggle switch (GPMDM-A6) to ON.		
4.	UUT INPUT POWER CIRCUITS TEST		
	a. Insure MAIN POWER BREAKER (CB1) is ON.		
	b. Set POWER switch (S2) to ON.	POWER lamp (DS4) lights green.	If lamp does not light, refer to input power circuits flow chart.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
5.	FRONT PANEL ALARM LAMPS TEST		
	a. Press and hold ALARM TEST switch (S1).	ALARM PWR SPLY (DS3), ALARM LOSS OF INPUT (DS2), ALARM SUMMARY (DS1) lamps light red.	If all lamps do not light, refer to front panel alarm lamps flow chart.
	b. Release ALARM TEST switch (S1)	Only POWER lamp (DS4) remains lit.	
6.	POWER SUPPLY CIRCUITS TEST		
	Remove power supply compartment cover. **NOTE** ALARM TEST switch does not light power supply LEDs. LEDs will light only when a fault occurs.	A1 LED (red) OFF; A2 LED (red) OFF; A3 LED (red) OFF; A4 LED (red) OFF; ALARM PWR SPLY OFF.	If any power supply LED or ALARM PWR SPLY lamp is ON, refer to power supply circuits flow chart.
7.	+28 VDC SOURCE		
	• Set POWER switch (S2) to OFF.		
	• Disconnect POWER cable from 115 V ac source.		
	• Connect POWER cable to 28 V dc source (see figure FO-12B).		
	• Set POWER switch (S2) to ON.	POWER lamp (DS4) lights green.	If lamp does not light, replace DC INPUT CCA (A4) and retest. If test continues to fail replace complete unit.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
7. (Cont)	• Set POWER switch (S2) to OFF. • Disconnect POWER cable from 28 V dc source. • Connect POWER cable to 115 V ac source. • Set POWER switch (S2) to ON.		
8.	LOGIC ASSEMBLY FAULT LED TEST		
	Press and release ALARM TEST switch (S1).	Each FAULT LED on CCAs lights. **NOTE** OOF LED need not light.	If any logic assembly FAULT LED fails to go ON, refer to logic assembly FAULT LEDs flow chart.
9.	BITE AND ALARM TEST		
	a. Wait approximately 15 seconds.	ALARM SUMMARY (DS2) OFF, OOF LED (A5) OFF, all FAULT LEDs OFF.	If ALARM SUMMARY or any LED is ON, refer to BITE and ALARM test flow chart.
	b. Disconnect GROUP connector (P18) from UUT LOW GROUP (J1).	SMY (SDI) ON, LOI (DS2) ON GPMDM LED ON OOF LED on first GP FRG CCA used ON. FRG CCA used ON.	If OOF LED fails to light, replace GP FRG and retest. If test continues to fail, continues to fail, replace complete unit.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
9. (Cont)			If ALARM LOI lamp is not ON, first replace GPMDM CCA (A16) and retest; second, replace BITE 2 CCA (A4) and retest. If test continues to fail, replace complete unit.
	c. Reconnect GROUP connector (P18) to UUT LOW GROUP (J1).	All lamps and LEDs OFF.	If ALARM LOSS OF INPUT lamp fails to go OFF, check cable connections. If cable connections proper and ALARM LOSS OF INPUT lamp fails to go OFF, replace complete unit.
10.	SA-ALARM TEST		
	Assure SA-ALARM cables are connected to the + (P12) and - (P11) terminals of the AN/PSM-45 Multimeter.	AN/PSM-45 indicates infinite ohms (open circuit).	If test fails, replace: first, TMG GEN CCA (A15); second, BITE CCA (A5). If test continues to fail, replace complete unit.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
10. (Cont)	a. Press and release ALARM TEST switch (S1).	AN/PSM-45 indicates 0.1 ohms max (short circuit).	If test fails replace: first, TMG GEN CCA (A15); second, BITE CCA (A5). If test continues to fail, replace complete unit.
	b. Disconnect SA-ALARM cables from the AN/PSM-45 Multimeter.		
11.	S-ALARM TEST		
	a. Connect S-ALARM + (P10) and - (P11) cables to the (+) and (-) terminals of the AN/PSM-45 Multimeter.	AN/PSM-45 indicates infinite ohms (open circuit).	If test fails replace: first, AC IN PUT CCA (A1); second, BITE 2 CCA (A5). If test continues to fail, replace complete unit.
	b. Press and release ALARM TEST switch (S1).	AN/PSM-45 indicates 0.1 ohms max (short circuit).	If test fails replace: first, AC INPUT CCA (A1); second, BITE 2 CCA (A5). If test continues to fail, replace complete unit.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
12.	AAU CIRCUITS TEST (AAU CCAs ONLY) WARNING High voltages are present. Insure safety covers are in place on P9 and P10 before making connections. • Connect REC/IN cable (P16) to HP-3551A right hand banana jacks. • Connect REC/OUT cable (P15) to HP-3551A left hand banana jacks. Select first AAU channel:		
	a. Assure CH 1-8 IN/OUT field wires are connected to the selected CHAN IN/OUT field wire posts on UUT.		
	b. Record ANALOG channel check measurement.	-17 ±1 dBm on HP-3551A monitor and no FAULT LEDs lit.	If test fails, refer to AAU circuits flow chart.
	c. Disconnect SEND cable (P9) from HP-3551A and set HP-3551A RECEIVE switch to NOISE WITH TONE.		
	d. Record Idle Channel Noise measurement.	33 dB RNC max on HP-3551A monitor and no FAULT LEDs lit.	If test fails replace: first, AAU CCA under test; second, MUX/DEMUX CCA (A14). If tests continue to fail, replace complete unit.

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
12. (Cont)	e. Connect next AAU channel REC/IN and Send/OUT cables to HP-3551A Transmission Test Set (see Configuration Audit).		
	f. Connect CHAN IN/OUT field wires to next AAU channel CHAN IN/OUT field wire posts on UUT.		
	g. Repeat steps a. through g. for each channel on all AAU CCAs.		
	h. At completion of AAU circuit tests, press HP-3551A POWER CHARGE switch and disconnect banana plugs from the REC and SEND section jacks.		
13.	MAINT OW OUTPUT (AVOW) OPERATIONAL CHECK		
	a. Assure that step 2 has been performed.		
	b. Disconnect REC/IN (P10) and SEND/OUT (P9) banana cables from HP-3551A.		
	c. Set RECEIVE FUNCTION selector switch to TONE NORMAL.		
	d. Press SEND LEVEL switch on Display Monitor.		
	e. Rotate LEVEL RANGE selector to 0 - +10.		
	f. Unlock and rotate LEVEL switch to read +10 dBm on Display Monitor.		
	g. Lock LEVEL switch at +10 dBm.		
	h. Connect REC (P14) and SEND (P13) banana plugs to HP-3551A as follows:		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
13. (Cont)	• SEND (P13) to the designated SEND (left hand) section jacks.		
	• REC (P14) to the designated REC (right hand) section jacks.		
	i. Press RECEIVE LEVEL switch on Display Monitor		
	j. Observe the Display Monitor for AVOW output.	-13 dBm ±1 dBm	If test fails, replace GP MDM CCA (A6) and retest. If test continues to fail, replace complete unit.
	k. Move OW connector (P2) from UUT AVOW LOW GROUP (J6) to UUT AVOW HIGH GROUP (J7).		
	l. Observe the Display Monitor for AVOW output.	Between -23 and 20 dBm.	If test fails, replace GP MDM CCA (A16) and retest. If test continues to fail, replace complete unit.
14.	LP MDM POWER FEED TEST (LP MDM CCAs only)		
	Select the first LP MDM CCA and its appropriate REC/IN, SEND/OUT cable pair.		
	a. Connect CH 1-8 IN and CH 1-8 OUT connectors to applicable field wire post.		
	b. Connect REC/IN (P16) and SEND/OUT (P15) connectors to PWR FEED/LOAD adapter box banana jacks.		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
14. (Cont)	c. Press AN/PSM-45 FUNCTION pushbutton DC (out).		
	d. Press AN/PSM-45 RANGE pushbutton 200V.		
	e. Set applicable LP MDM PWR FD switch to ON (up).		
	f. Connect AN/PSM-45 test leads to PWR/FEED/LOAD adapter box (J2). Record reading.	+46.8 to 56 V dc.	If test fails, refer to LP MDM power feed circuits flow chart.
	g. Set PWR FD switch to OFF (down).		
	h. Repeat steps a. thru g. for each channel on all LP MDM CCAs.		
	i. At conclusion of tests, all LP MDM PWR FD switches should be OFF.		
15.	LP MDM DIGITAL ERRORS TEST (LP MDM CCAs only)		
	a. Assure that step 2 has been performed.		
	b. Select the first LP MDM CCA channel (see Configuration Audit in step 1).		
	c. Connect CH 1-8 OUT field wires to selected CHAN OUT field wire posts on the UUT.		
	d. Connect CH 1-8 IN field wires to selected CHAN IN field wire posts on the UUT.		
	e. Connect REC/IN cables (P16) to the SG-1139 DIPHASE IN banana jacks.		
	f. Connect SEND/OUT cables (P15) to the SG-1139 DIPHASE OUT banana jacks.		

2-28. TEST SEQUENCE—Continued

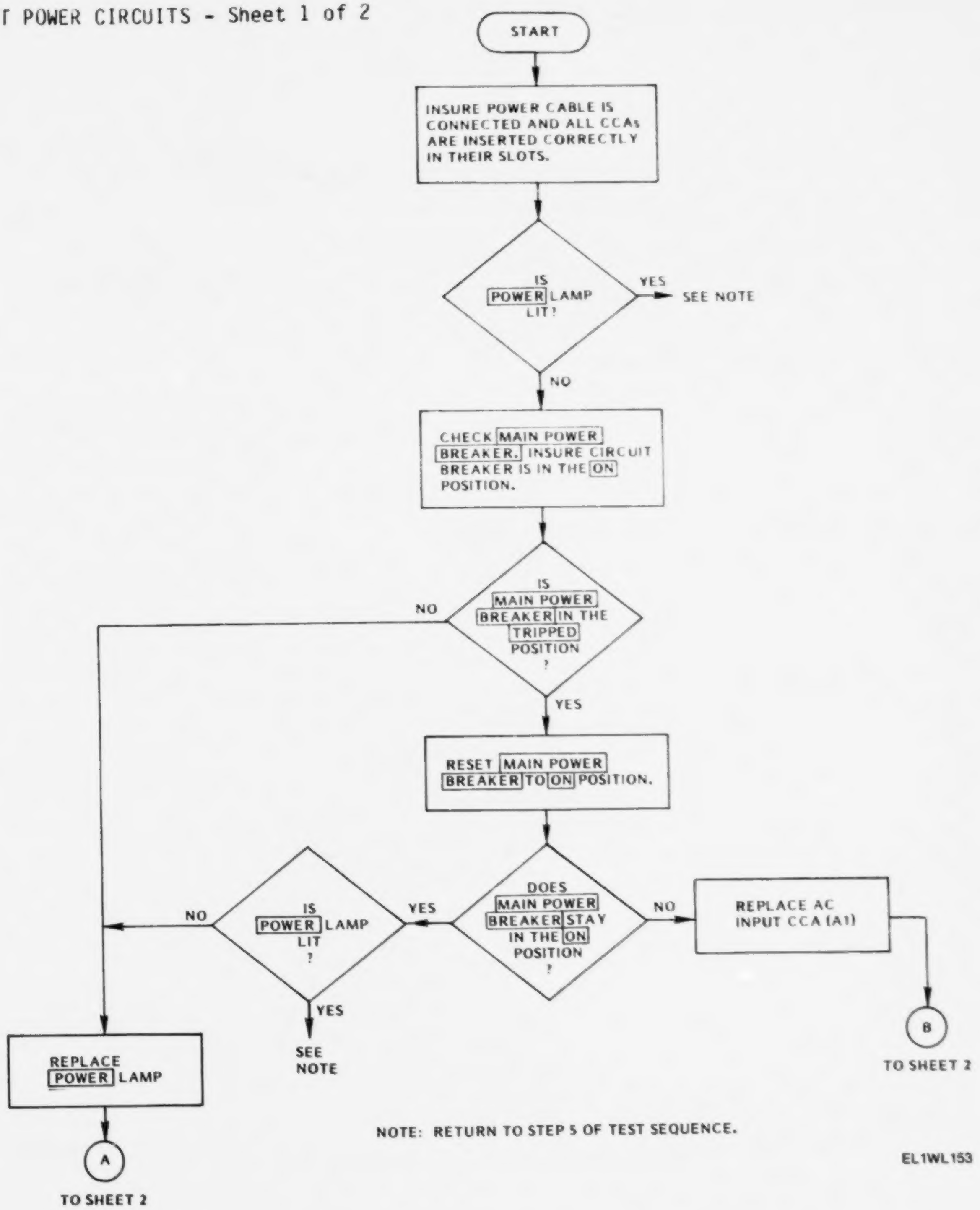
Step	Procedure	Observation	Action
15. (Cont)	g. Push SG-1139 RESET button.		
	h. Observe LP MDM fault LED	Fault LED: OFF.	If test fails, refer to Diagonistics for LP MDM Digital Errors
	i. Observe DATA IN, TIM IN, and BER indications on SG-1139	No errors for ≈ 30 seconds on ERRORS indicator and DATA IN and TMG IN, and BER GO LEDs lit.	If test fails, refer to Diagnostics for LP MDM Digital Errors.
	j. Repeat steps of a.-i. for each of the remaining LP MDM CCA channels.		If test fails, replace: first, LP MDM CCA under test; second, MUX/DEMUX CCA (A8); last, replace complete unit.
16.	REMOTE POWER TEST		
	a. Connect AN/PSM-45 to Power Feed/Load Adapter (J2), using the test leads provided with the multimeter.		
	b. Press DC VOLTS pushbutton on AN/PSM-45.		
	c. Press 200 range pushbutton on the AN/PSM-45.		

2-28. TEST SEQUENCE—Continued

Step	Procedure	Observation	Action
16. (Cont)	d. Verify GND from Power Feed Load Adapter box connected to UUT GND.		
	WARNING High voltage will be present in next step.		
	e. Set REMOTE PWR OUT switch (S3) to ON (up).	AN/PSM-45 indicates 175 V dc ± 5 V.	If test fails, replace 180 VDC CCA (A3), and retest. If test still fails, replace complete unit.
	END OF OPERATIONAL TESTS		

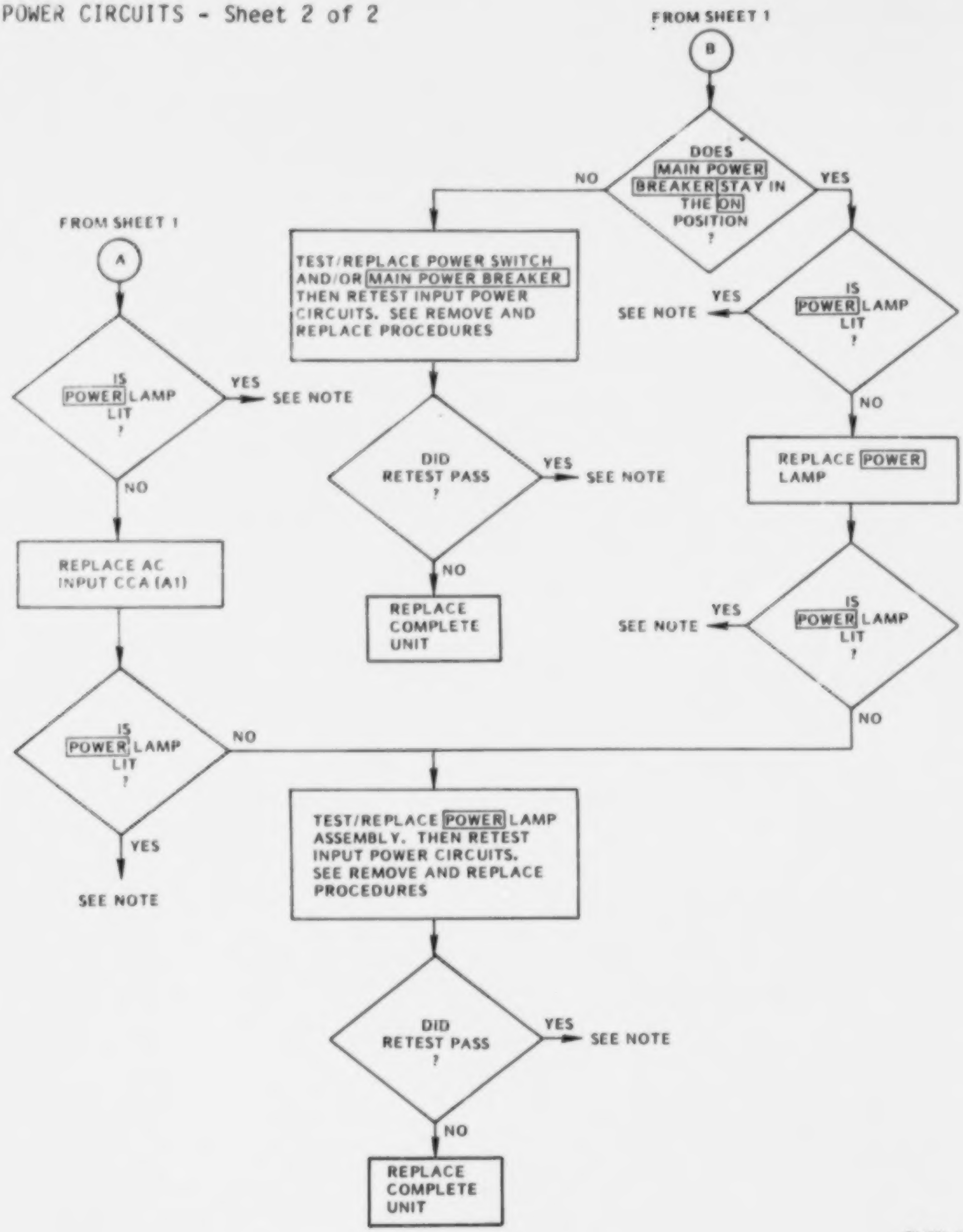
2-29. DIAGNOSTICS FLOWCHART

INPUT POWER CIRCUITS - Sheet 1 of 2


START
INSURE POWER CABLE IS CONNECTED AND ALL CCAs ARE INSERTED CORRECTLY IN THEIR SLOTS.
IS POWER LAMP LIT?
YES
SEE NOTE
NO
CHECK MAIN POWER BREAKER. INSURE CIRCUIT BREAKER IS IN THE ON POSITION.
IS MAIN POWER BREAKER IN THE TRIPPED POSITION ?
NO
YES
RESET MAIN POWER BREAKER TO ON POSITION.
DOES MAIN POWER BREAKER STAY IN THE ON POSITION ?
YES
NO
REPLACE AC INPUT CCA (A1)
B
TO SHEET 2
IS POWER LAMP LIT ?
NO
YES
SEE NOTE
REPLACE POWER LAMP
A
TO SHEET 2
NOTE: RETURN TO STEP 5 OF TEST SEQUENCE.
EL1WL153

2-29. DIAGNOSTICS FLOWCHART—Continued

INPUT POWER CIRCUITS - Sheet 2 of 2

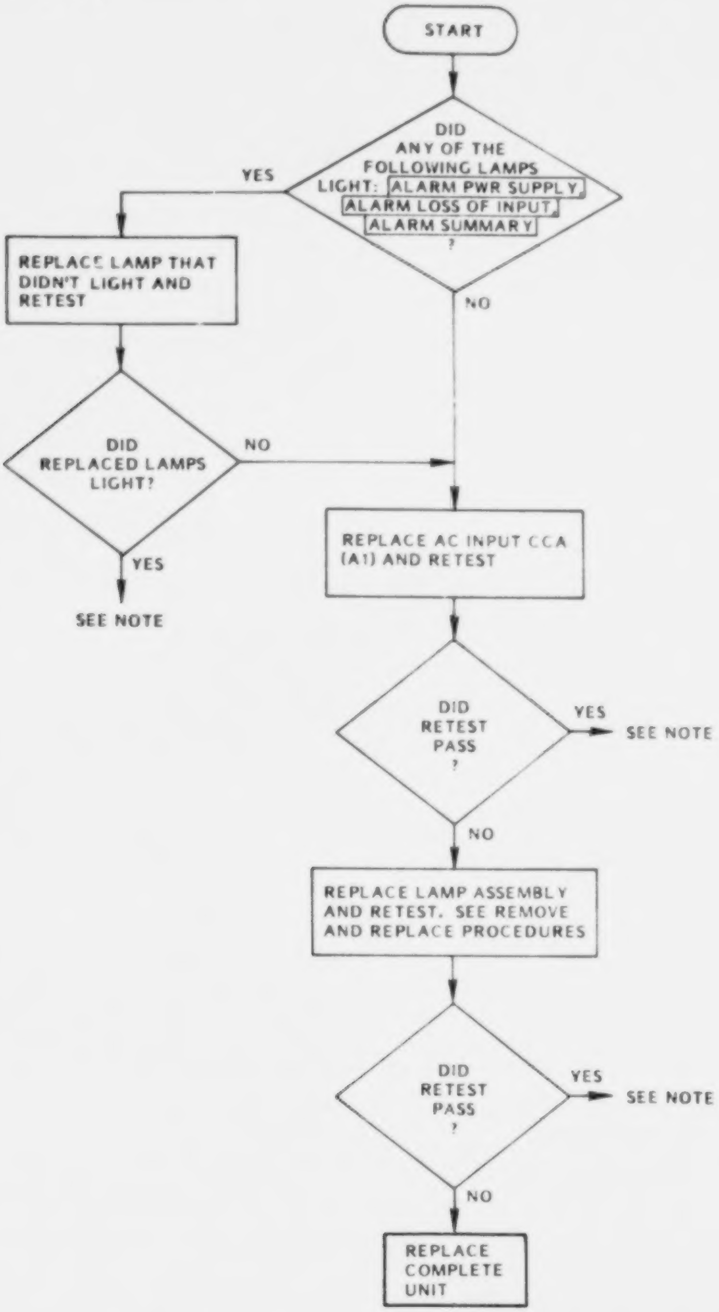

FROM SHEET 1
B
DOES MAIN POWER BREAKER STAY IN THE ON POSITION ?
NO
YES
TEST/REPLACE POWER SWITCH AND/OR MAIN POWER BREAKER THEN RETEST INPUT POWER CIRCUITS. SEE REMOVE AND REPLACE PROCEDURES
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE COMPLETE UNIT
IS POWER LAMP LIT ?
YES
SEE NOTE
NO
REPLACE POWER LAMP
IS POWER LAMP LIT ?
YES
SEE NOTE
NO
FROM SHEET 1
A
IS POWER LAMP LIT ?
YES
SEE NOTE
NO
REPLACE AC INPUT CCA (A1)
IS POWER LAMP LIT ?
NO
YES
SEE NOTE
TEST/REPLACE POWER LAMP ASSEMBLY. THEN RETEST INPUT POWER CIRCUITS. SEE REMOVE AND REPLACE PROCEDURES
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE COMPLETE UNIT

EL1W 154

NOTE: RETURN TO STEP 5 OF TEST SEQUENCE.

2-29. DIAGNOSTICS FLOWCHART—Continued

FRONT PANEL ALARM LAMPS

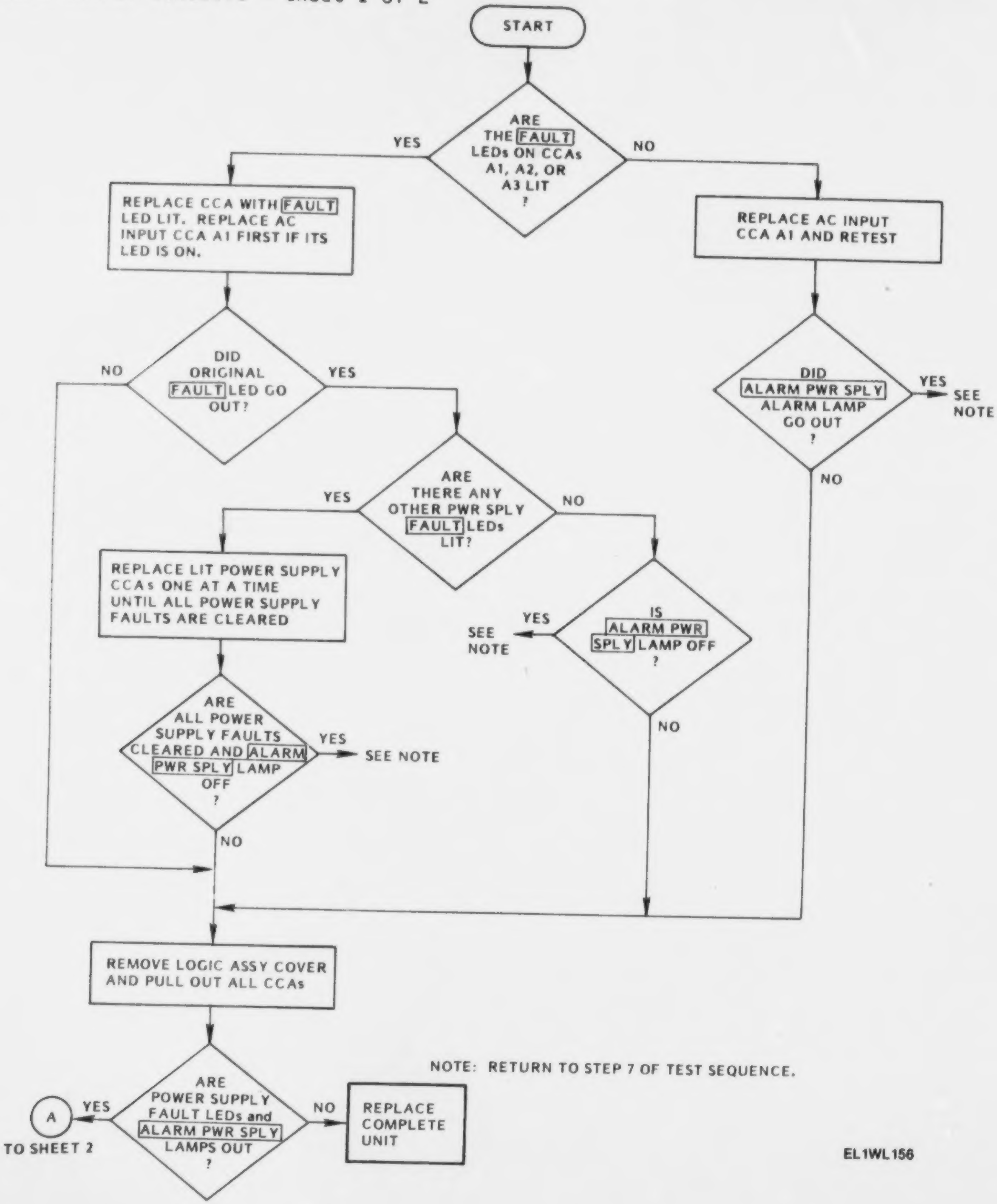

START
DID ANY OF THE FOLLOWING LAMPS LIGHT: ALARM PWR SUPPLY, ALARM LOSS OF INPUT, ALARM SUMMARY ?
YES
NO
REPLACE LAMP THAT DIDN'T LIGHT AND RETEST
DID REPLACED LAMPS LIGHT?
NO
YES
SEE NOTE
REPLACE AC INPUT CCA (A1) AND RETEST
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE LAMP ASSEMBLY AND RETEST. SEE REMOVE AND REPLACE PROCEDURES
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE COMPLETE UNIT

NOTE: RETURN TO STEP 6 OF TEST SEQUENCE.

EL1WL155

2-29. DIAGNOSTICS FLOWCHART—Continued

POWER SUPPLY CIRCUITS - Sheet 1 of 2

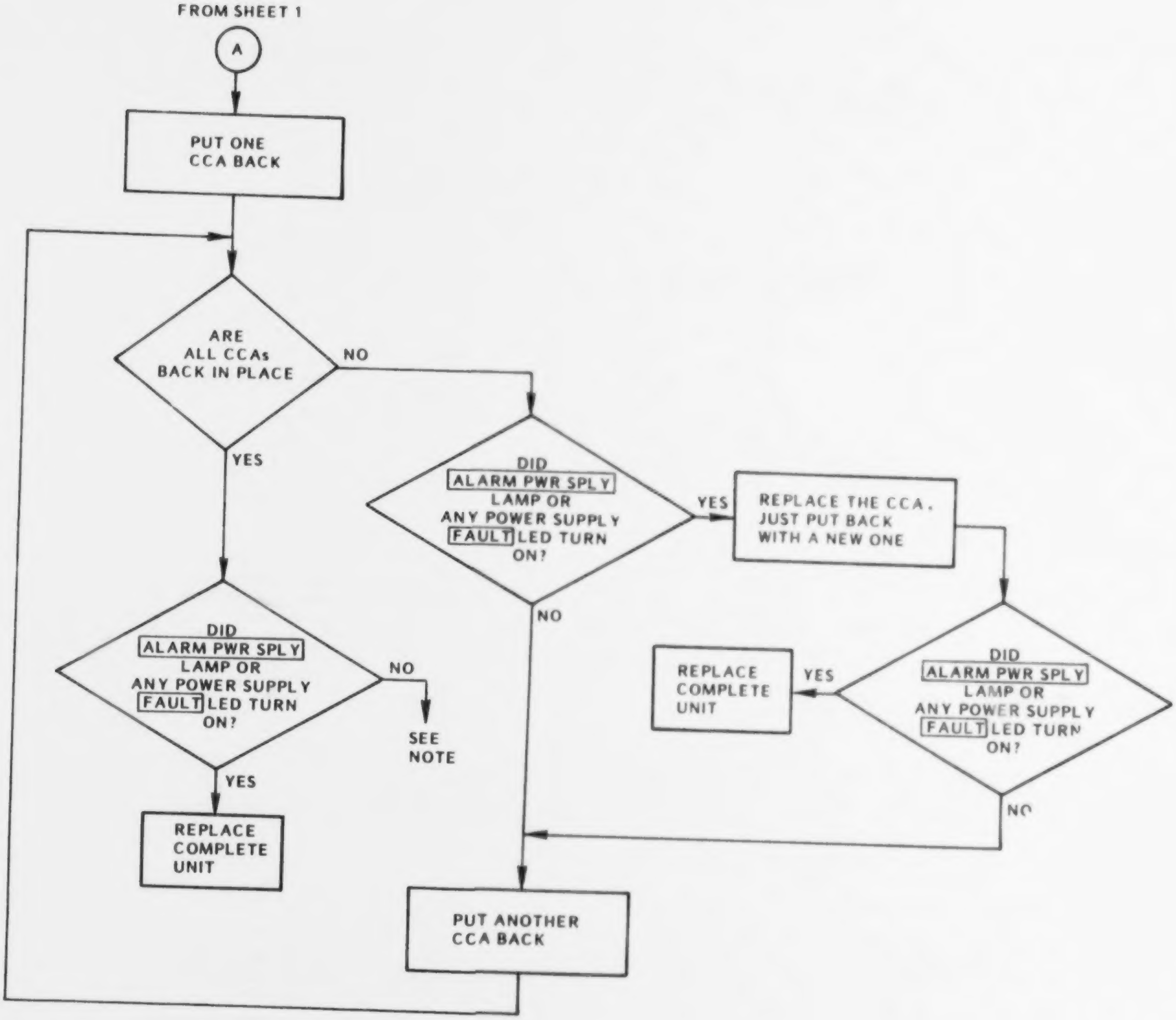

START
ARE THE FAULT LEDs ON CCAs A1, A2, OR A3 LIT ?
YES
NO
REPLACE CCA WITH FAULT LED LIT. REPLACE AC INPUT CCA A1 FIRST IF ITS LED IS ON.
REPLACE AC INPUT CCA A1 AND RETEST
DID ORIGINAL FAULT LED GO OUT?
NO
YES
DID ALARM PWR SPLY ALARM LAMP GO OUT ?
YES
SEE NOTE
NO
ARE THERE ANY OTHER PWR SPLY FAULT LEDs LIT?
YES
NO
REPLACE LIT POWER SUPPLY CCAs ONE AT A TIME UNTIL ALL POWER SUPPLY FAULTS ARE CLEARED
IS ALARM PWR SPLY LAMP OFF ?
YES
SEE NOTE
NO
ARE ALL POWER SUPPLY FAULTS CLEARED AND ALARM PWR SPLY LAMP OFF ?
YES
SEE NOTE
NO
REMOVE LOGIC ASSY COVER AND PULL OUT ALL CCAs
ARE POWER SUPPLY FAULT LEDs and ALARM PWR SPLY LAMPS OUT ?
YES
A
TO SHEET 2
NO
REPLACE COMPLETE UNIT

NOTE: RETURN TO STEP 7 OF TEST SEQUENCE.

EL1WL156

2-29. DIAGNOSTICS FLOWCHART—Continued

POWER SUPPLY CIRCUITS - Sheet 2 of 2

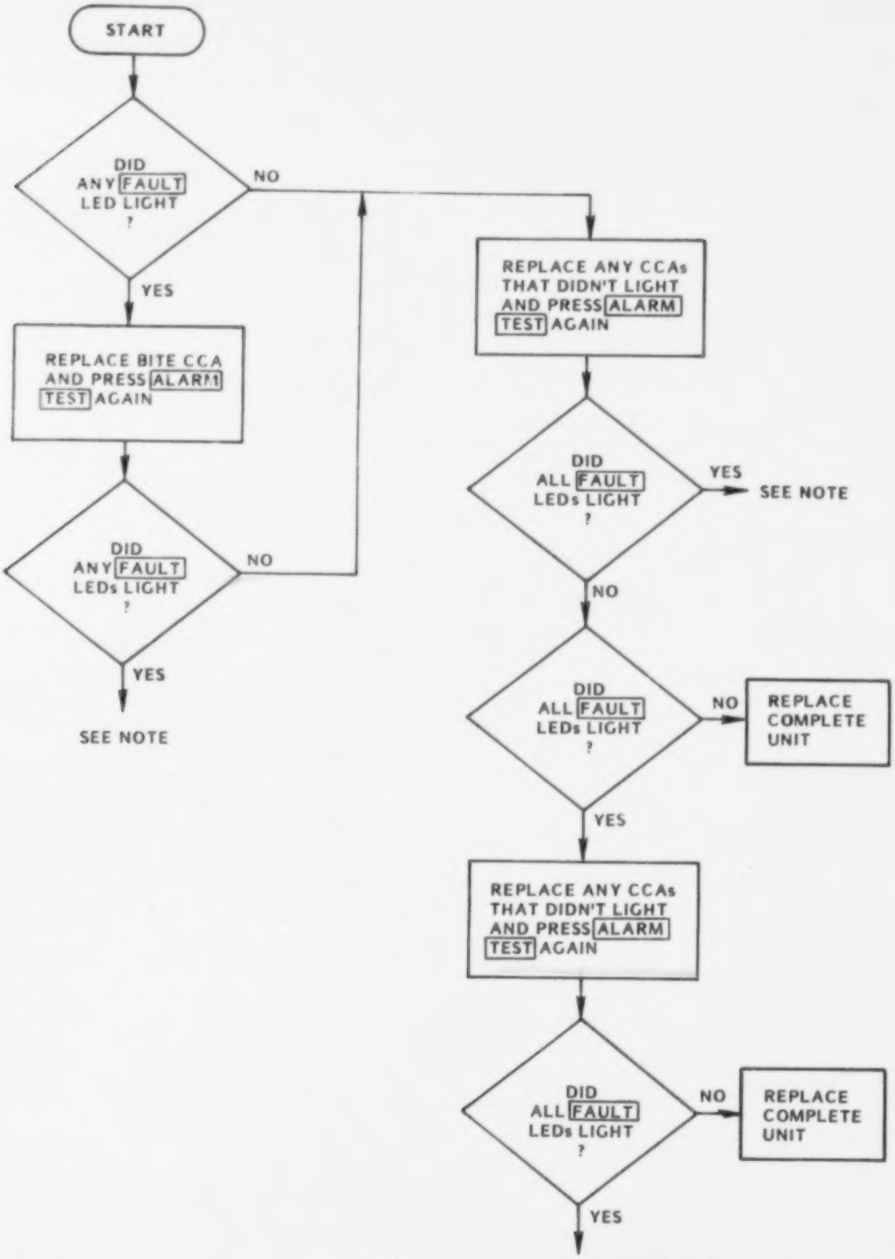

FROM SHEET 1
A
PUT ONE CCA BACK
ARE ALL CCAs BACK IN PLACE
NO
YES
DID ALARM PWR SPLY LAMP OR ANY POWER SUPPLY FAULT LED TURN ON?
NO
SEE NOTE
YES
REPLACE COMPLETE UNIT
DID ALARM PWR SPLY LAMP OR ANY POWER SUPPLY FAULT LED TURN ON?
YES
REPLACE THE CCA. JUST PUT BACK WITH A NEW ONE
NO
DID ALARM PWR SPLY LAMP OR ANY POWER SUPPLY FAULT LED TURN ON?
YES
REPLACE COMPLETE UNIT
NO
PUT ANOTHER CCA BACK

NOTE: RETURN TO STEP 7 OF TEST SEQUENCE.

EL1WL157

2-29. DIAGNOSTICS FLOWCHART—Continued

LOGIC ASSEMBLY FAULT LED

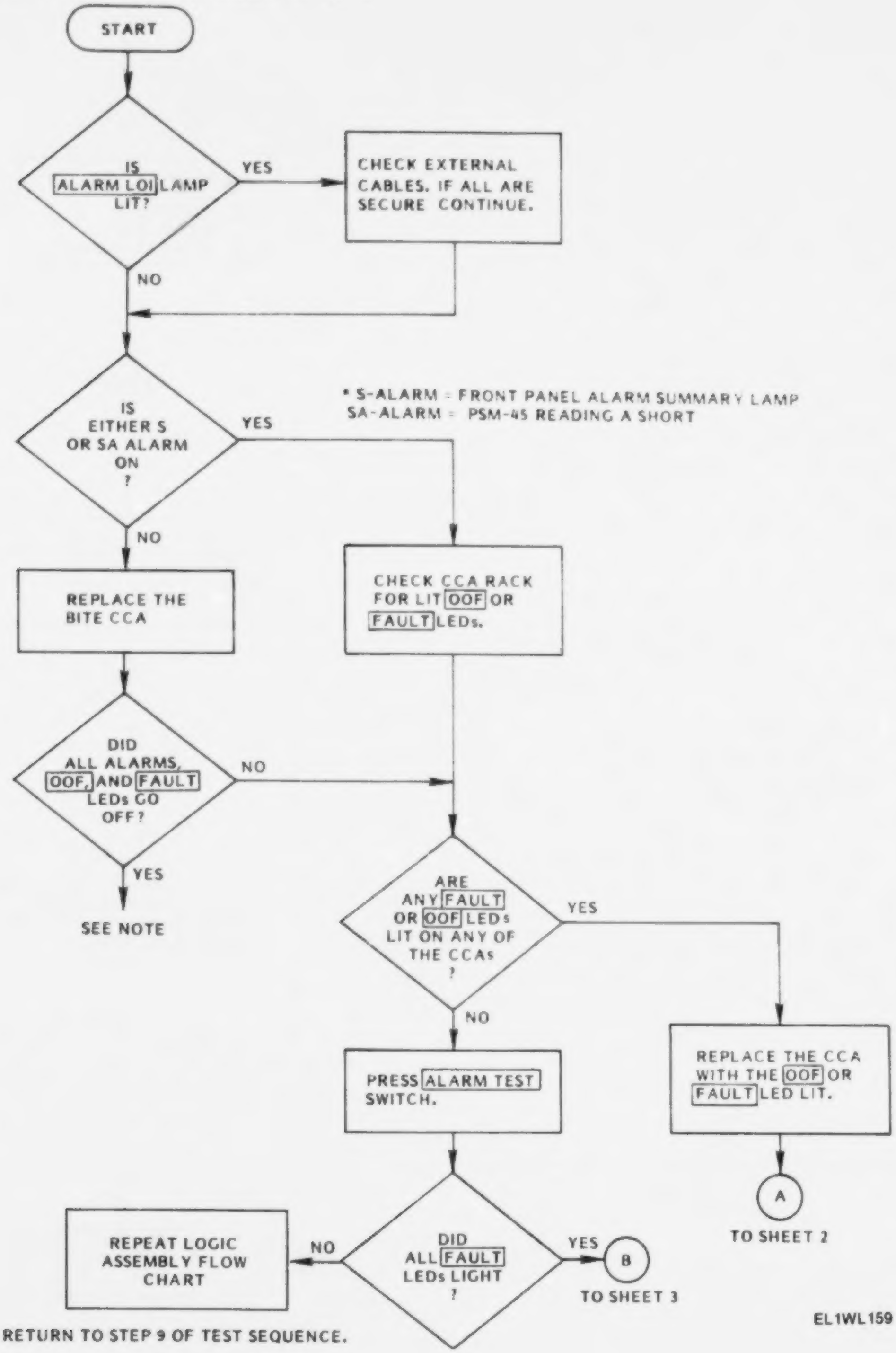

START
DID ANY FAULT LED LIGHT ?
NO
YES
REPLACE BITE CCA AND PRESS ALARM TEST AGAIN
DID ANY FAULT LEDs LIGHT ?
NO
YES
SEE NOTE
REPLACE ANY CCAs THAT DIDN'T LIGHT AND PRESS ALARM TEST AGAIN
DID ALL FAULT LEDs LIGHT ?
YES
SEE NOTE
NO
DID ALL FAULT LEDs LIGHT ?
NO
REPLACE COMPLETE UNIT
YES
REPLACE ANY CCAs THAT DIDN'T LIGHT AND PRESS ALARM TEST AGAIN
DID ALL FAULT LEDs LIGHT ?
NO
REPLACE COMPLETE UNIT
YES

NOTE: RETURN TO STEP 8 OF TEST SEQUENCE.

EL1WL158

2-29. DIAGNOSTICS FLOWCHART—Continued

BITE AND ALARM CIRCUITS - Sheet 1 of 3

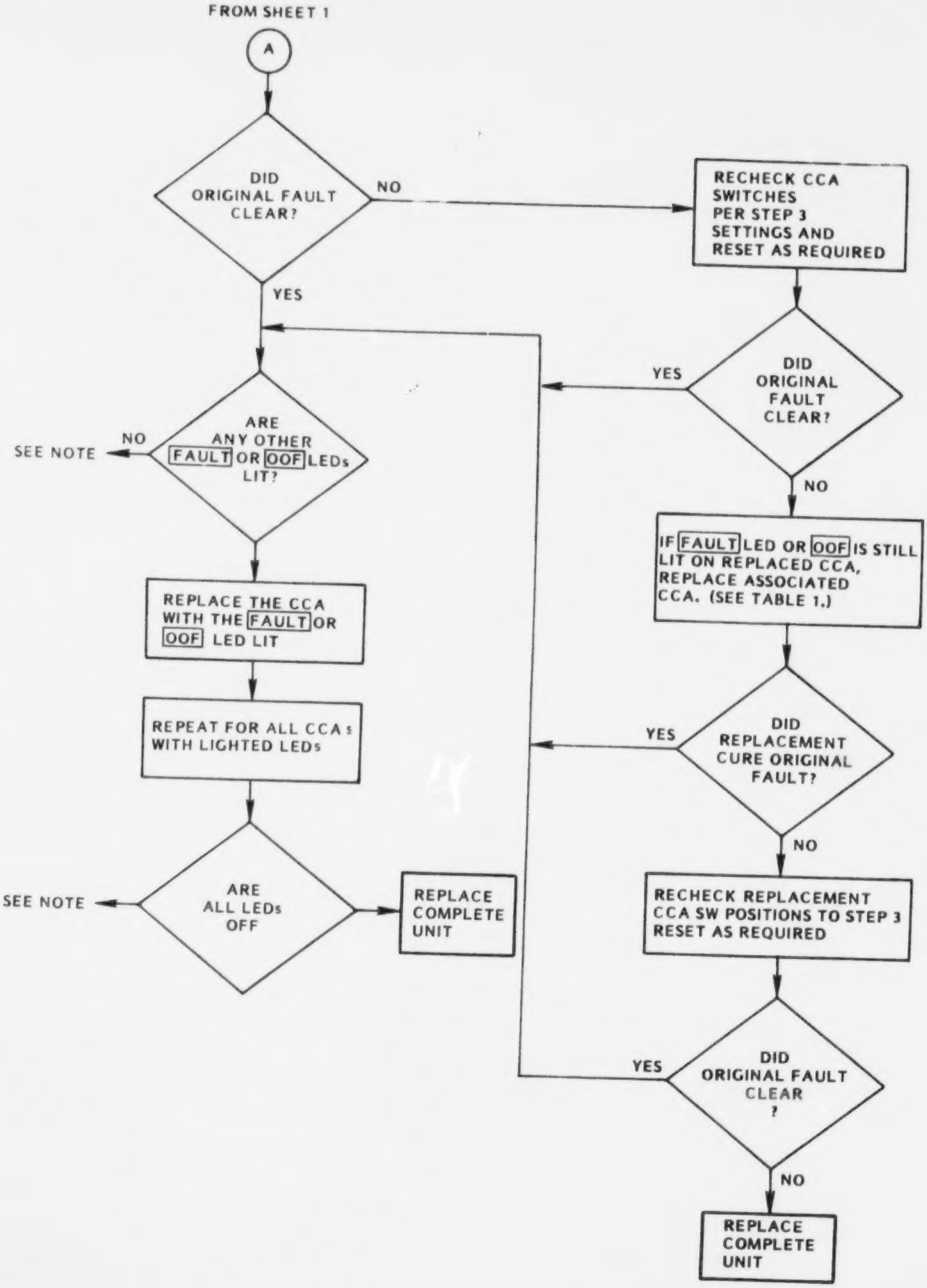

START
IS ALARM LOI LAMP LIT?
YES
CHECK EXTERNAL CABLES. IF ALL ARE SECURE CONTINUE.
NO
IS EITHER S OR SA ALARM ON ?
* S-ALARM = FRONT PANEL ALARM SUMMARY LAMP
SA-ALARM = PSM-45 READING A SHORT
YES
NO
REPLACE THE BITE CCA
CHECK CCA RACK FOR LIT OOF OR FAULT LEDs.
DID ALL ALARMS, OOF, AND FAULT LEDs GO OFF?
NO
YES
SEE NOTE
ARE ANY FAULT OR OOF LEDs LIT ON ANY OF THE CCAs ?
YES
NO
PRESS ALARM TEST SWITCH.
REPLACE THE CCA WITH THE OOF OR FAULT LED LIT.
A
TO SHEET 2
REPEAT LOGIC ASSEMBLY FLOW CHART
NO
DID ALL FAULT LEDs LIGHT ?
YES
B
TO SHEET 3

NOTE: RETURN TO STEP 9 OF TEST SEQUENCE.

EL1WL159

2-29. DIAGNOSTICS FLOWCHART—Continued

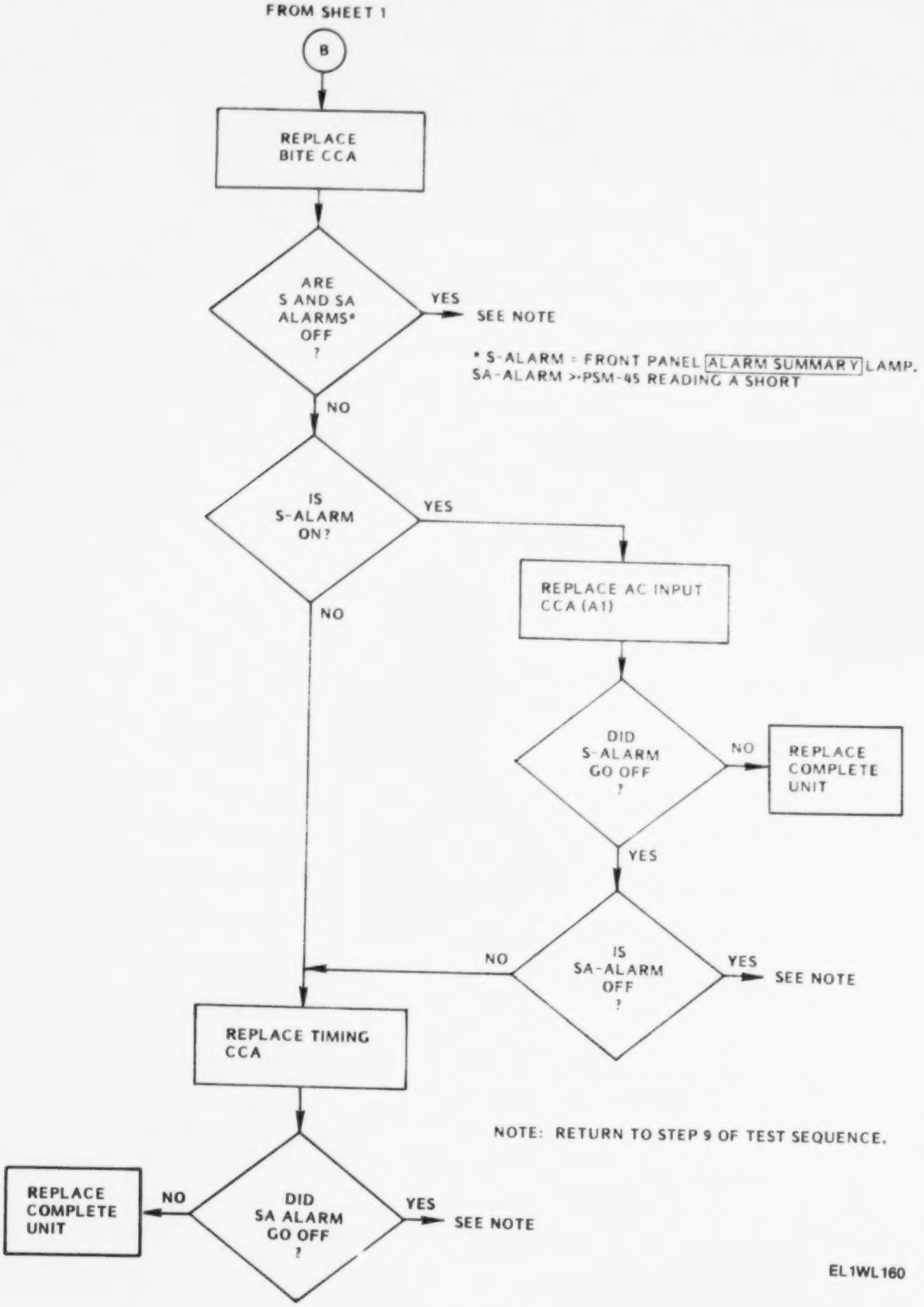
BITE AND ALARM CIRCUITS - Sheet 2 of 3


FROM SHEET 1
A
DID ORIGINAL FAULT CLEAR?
NO
RECHECK CCA SWITCHES PER STEP 3 SETTINGS AND RESET AS REQUIRED
YES
DID ORIGINAL FAULT CLEAR?
YES
NO
SEE NOTE
ARE ANY OTHER FAULT OR OOF LEDs LIT?
IF FAULT LED OR OOF IS STILL LIT ON REPLACED CCA, REPLACE ASSOCIATED CCA. (SEE TABLE 1.)
REPLACE THE CCA WITH THE FAULT OR OOF LED LIT
REPEAT FOR ALL CCAs WITH LIGHTED LEDs
YES
DID REPLACEMENT CURE ORIGINAL FAULT?
NO
SEE NOTE
ARE ALL LEDs OFF
REPLACE COMPLETE UNIT
RECHECK REPLACEMENT CCA SW POSITIONS TO STEP 3 RESET AS REQUIRED
YES
DID ORIGINAL FAULT CLEAR ?
NO
REPLACE COMPLETE UNIT

NOTE: RETURN TO STEP 9 OF TEST SEQUENCE. EL1WL161

2-29. DIAGNOSTICS FLOWCHART—Continued

BITE AND ALARM CIRCUITS - Sheet 3 of 3


FROM SHEET 1
B
REPLACE BITE CCA
ARE S AND SA ALARMS* OFF ?
YES
SEE NOTE
NO
IS S-ALARM ON?
YES
NO
REPLACE AC INPUT CCA (A1)
DID S-ALARM GO OFF ?
NO
REPLACE COMPLETE UNIT
YES
IS SA-ALARM OFF ?
NO
YES
SEE NOTE
REPLACE TIMING CCA
DID SA ALARM GO OFF ?
NO
REPLACE COMPLETE UNIT
YES
SEE NOTE

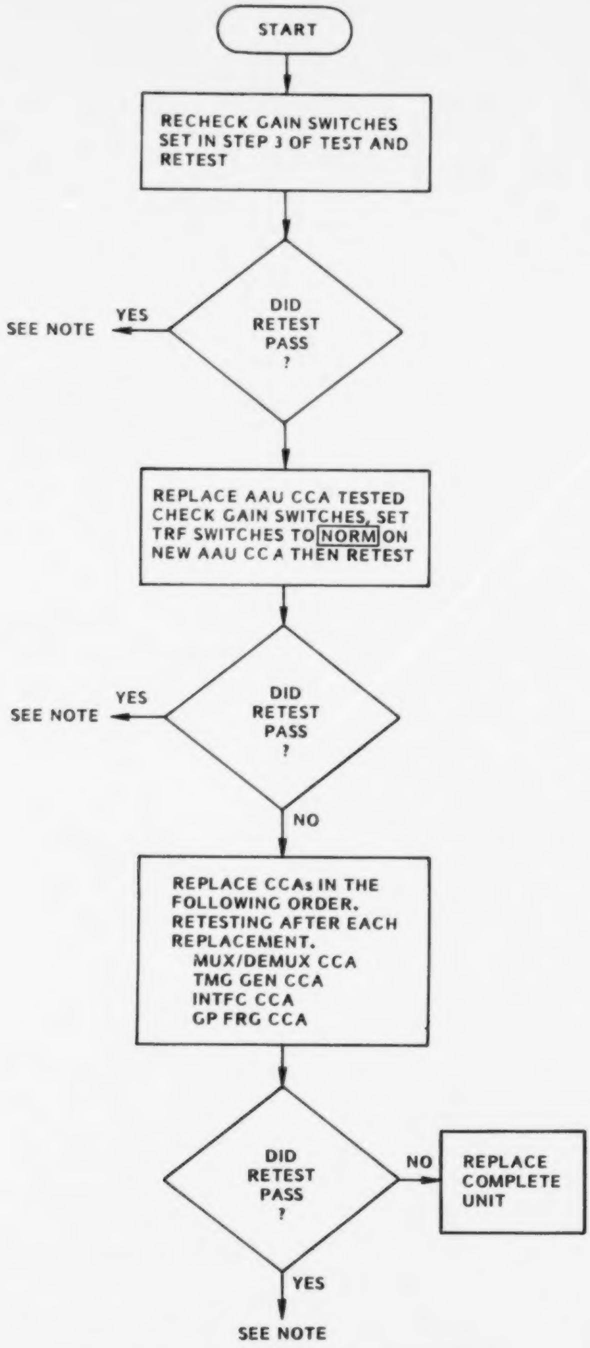
* S-ALARM = FRONT PANEL ALARM SUMMARY LAMP.
SA-ALARM >-PSM-45 READING A SHORT

NOTE: RETURN TO STEP 9 OF TEST SEQUENCE.

EL1WL160

2-29. DIAGNOSTICS FLOWCHART—Continued

AAU CIRCUITS TEST

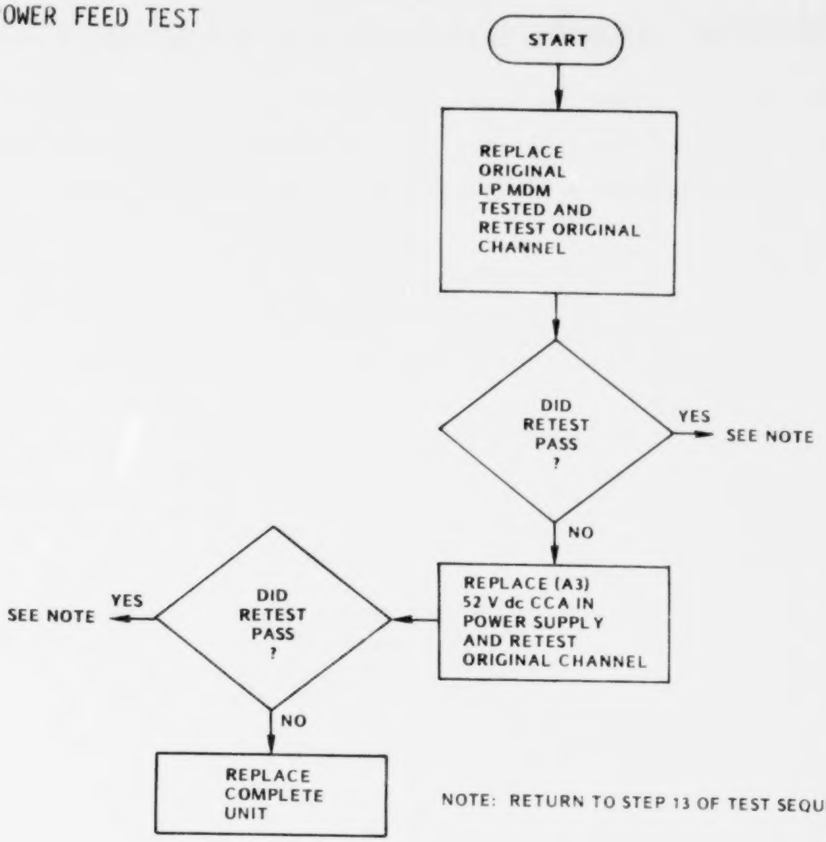

START
RECHECK GAIN SWITCHES SET IN STEP 3 OF TEST AND RETEST
DID RETEST PASS ?
YES
SEE NOTE
REPLACE AAU CCA TESTED CHECK GAIN SWITCHES, SET TRF SWITCHES TO NORM ON NEW AAU CCA THEN RETEST
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE CCAs IN THE FOLLOWING ORDER. RETESTING AFTER EACH REPLACEMENT.
MUX/DEMUX CCA
TMG GEN CCA
INTFC CCA
GP FRG CCA
DID RETEST PASS ?
NO
REPLACE COMPLETE UNIT
YES
SEE NOTE

NOTE: RETURN TO STEP 12 OF TEST SEQUENCE.

EL1WL162

2-29. DIAGNOSTICS FLOWCHART—Continued

LOOP MODEM POWER FEED TEST


START
REPLACE ORIGINAL LP MDM TESTED AND RETEST ORIGINAL CHANNEL
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE (A3) 52 V dc CCA IN POWER SUPPLY AND RETEST ORIGINAL CHANNEL
DID RETEST PASS ?
YES
SEE NOTE
NO
REPLACE COMPLETE UNIT

NOTE: RETURN TO STEP 13 OF TEST SEQUENCE.

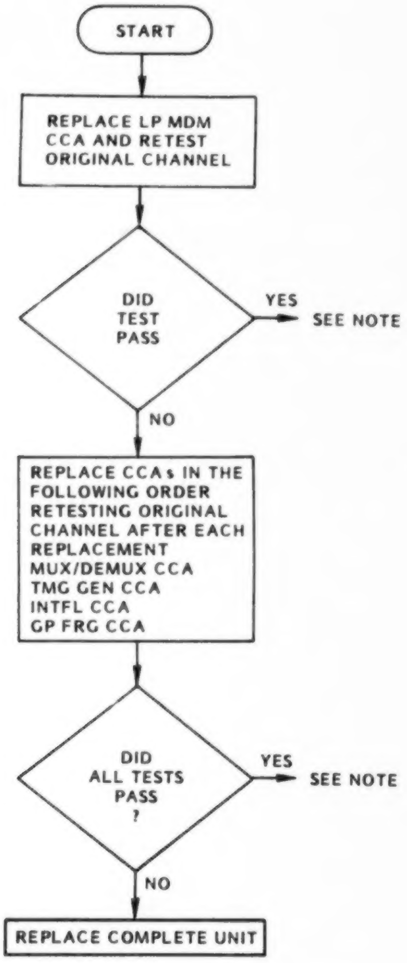
TABLE 1

CCA REPLACED	ASSOCIATED CCA
GROUP MODEM (A6)	GROUP FRAMING (A7), TIMING GENERATOR (A15), BITE 2 (A5)
GROUP FRAMING (A7)	GROUP MODEM (A6), MUX/DEMUX (A8), TIMING GENERATOR (A15), BITE 2 (A5)
MUX/DEMUX (A8)	GROUP FRAMING (A7), MUX/DEMUX (A13), TIMING GENERATOR (A15), BITE 2 (A5)
LOOP MODEM OR AAU (A9-A12)	MUX/DEMUX (A13), TIMING GENERATOR (A15), BITE 2 (A5)
MUX/DEMUX (A13)	LOOP MODEM OR AAU (A9-A12), MUX/DEMUX (A8), GROUP FRAMING (A14), TIMING GENERATOR (A15), BITE 2 (A5)
GROUP FRAMING (A14)	MUX/DEMUX (A13), TIMING GENERATOR (A15), GROUP MODEM (A16), BIT 2 (A5)
TIMING GENERATOR (A15)	GROUP MODEM (A16), BITE 2 (A5)
GROUP MODEM (A16)	GROUP FRAMING (A14), TIMING GENERATOR (A15), BITE 2 (A5)

EL1WL163

2-29. DIAGNOSTICS FLOWCHART—Continued

LP MDM


START
REPLACE LP MDM CCA AND RETEST ORIGINAL CHANNEL
DID TEST PASS
YES
SEE NOTE
NO
REPLACE CCAs IN THE FOLLOWING ORDER RETESTING ORIGINAL CHANNEL AFTER EACH REPLACEMENT
MUX/DEMUX CCA
TMG GEN CCA
INTFL CCA
GP FRG CCA
DID ALL TESTS PASS ?
YES
SEE NOTE
NO
REPLACE COMPLETE UNIT

NOTE: RETURN TO STEP 14 OF TEST SEQUENCE.

EL1WL164

CHAPTER 3
MAINTENANCE INSTRUCTIONS FOR GENERAL SUPPORT

General support maintenance is performed at a special repair facility using Electronic Equipment Test Station AN/USM-410 and Digital Card Tester AN/USM-465A. Appropriate CCA repair instructions will provided in a separate publication.

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, technical publications, and miscellaneous publications referenced in the manual.

A-2. FORMS

Technical Order System Publication Improvement Report and Reply	AFTO Form 22
Recommended Changes to Publications and Blank Forms	DA Form 2028
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Discrepancy in Shipment Report (DISREP)	SF-361
Report of Discrepancy (ROD)	SF-364
Manual Deficiency Report (Category 1)	DA Form 173
Quality Deficiency Report (Category 2)	SF-368

A-3. TECHNICAL MANUALS

Procedures for Destruction of Electronic Materiel to Prevent Enemy Use (Electronics Command)	TM 750-244-2
Operator and Organizational Maintenance Manual, Multiplexer TD-1234(P)/TTC	TM 11-5805-707-12
Organization, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools) for Multiplexer TD-1234(P)/TTC (NSN 5820-01-145-2458)	TM 11-5805-707-24P

## A-4. REGULATIONS

Report of Transportation Discrepancies in Shipments	AR 55-38
Reporting of Item and Packaging Discrepancies	AR 735-11-2

A-5. MISCELLANEOUS PUBLICATIONS

Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)	CTA 50-970
Consolidated Index of Army Publications and Blank Forms	DA Pam 310-1
The Army Maintenance Management System (TAMMS)	DA Pam 738-750
Federal Supply Code for Manufacturers (FSCM)	SB 708-42

APPENDIX B
EXPENDABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

B-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the TD-1234(P)/TTC. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

B-2. EXPLANATION OF COLUMNS

a. Column 1, Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "use cleaning rag, item 2, Appendix B").

b. Column 2, Level. This column identifies the lowest level of maintenance that requires the listed item.

C .... Operator or Crew
O .... Organizational Maintenance
F .... Direct Support Maintenance
H .... General Support Maintenance

c. Column 3, National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column 4, Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column 5, Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	0	6850-00-105-3084	Cleaning compound, trichlorotrifluoroethane (80244) MIL-C-81302	pt
2	0	8305-00-267-3015	Cheesecloth (81348) CCCC440	yd

APPENDIX C
WIRE RUN LISTS

C-1. ORGANIZATION OF WIRING DATA

This appendix contains wiring information for the electrical connector assemly contained in the RMC. Signal names in the wire run list are specific to the RMC; therefore, the correlation of signal names between schematic and wire run list is not always exact.

The wiring data is listed in groups and provides the to-from terminations and the and the level of each wire. The groups are identified by signal name. Within each signal name group, wires are identified by a wire number. The listing is arranged in alphanumeric sequence by signal name, and in numeric sequence by signal name, and in numeric sequence of wire numbers within the signal name group.

Coaxial twisted-pair wires are arranged in pairs within each signal name. Both wires bear the same wire number and level. In a twisted pair, the wire going to ground is always the secondary wire. In a coaxial wire, the center conductor is always the primary wire.

Some input/output pins shown on schematic diagrams are not used in all applications. Only those pins used are listed in the wire run list. Use the wire run list as a guide for pin usage in each application. Refer to interconnection diagram of the equipment for a cross reference of XA-designation to A-designation. The interconnection diagram also shows any additional CCA input/output pins that are used.

The wire list is broken down as follows:

- Interconnection from CCA to CCA or connector. All wires are on level 1 (pages C-2 to C-16).
- Interconnection from CCA to CCA. All wires are on level 2 (pages C-17 to C-22).

C-2. NON-STANDARD ABBREVIATIONS AND ENTRIES

Z(LVL) - Level at which the wire is placed on the pin. Level 1 is nearest to the panel and subsequent levels are in ascending order away from the panel.

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
AA1JMPR01	XA9-18	XA9-13	1
AA1JMPR02	XA9-16	XA9-69	1
AA1JMPR03	XA9-96	XA9-31	1
AA1JMPR04	XA9-102	XA9-40	1
AA2JMPR01	XA10-18	XA10-13	1
AA2JMPR02	XA10-16	XA10-69	1
AA2JMPR03	XA10-96	XA10-31	1
AA2JMPR04	XA10-102	XA10-40	1
AA3JMPR01	XA11-18	XA11-13	1
AA3JMPR02	XA11-16	XA11-69	1
AA3JMPR03	XA11-96	XA11-31	1
AA3JMPR04	XA11-102	XA11-40	1
AA4JMPR01	XA12-18	XA12-13	1
AA4JMPR02	XA12-16	XA12-69	1
AA4JMPR03	XA12-96	XA12-31	1
AA4JMPR04	XA12-102	XA12-40	1
BTB00N	XA5-7	XA6-30	1
BTB00N	XA7-70	XA8-66	1
BTB00N	XA9-94	XA10-94	1
BTB00N	XA11-94	XA12-94	1
BTB00N	XA13-66	XA14-70	1
BTB00N	XA15-81	XA16-30	1
BTB01N	XA5-102	XA6-26	1
BTB01N	XA7-73	XA8-10	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB01N	XA9-77	XA10-77	1
BTB01N	XA11-77	XA12-77	1
BTB01N	XA13-10	XA14-73	1
BTB01N	XA15-27	XA16-26	1
BTB02N	XA5-90	XA6-28	1
BTB02N	XA7-72	XA8-13	1
BTB02N	XA9-97	XA10-97	1
BTB02N	XA11-97	XA12-97	1
BTB02N	XA13-13	XA14-72	1
BTB02N	XA15-28	XA16-28	1
BTB03N	XA5-46	XA6-13	1
BTB03N	XA7-75	XA8-67	1
BTB03N	XA9-37	XA10-37	1
BTB03N	XA11-37	XA12-37	1
BTB03N	XA13-67	XA14-75	1
BTB03N	XA15-76	XA16-13	1
BTB04N	XA5-45	XA9-92	1
BTB04N	XA10-92	XA9-92	1
BTB05N	XA5-47	XA9-93	1
BTB05N	XA10-93	XA11-93	1
BTB06N	XA5-100	XA9-73	1
BTB06N	XA5-73	XA11-73	1
BTB07N	XA5-101	XA9-78	1
BTB07N	XA10-78	XA11-78	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB08N	XA5-43	XA6-27	1
BTB08N	XA7-68	XA8-49	1
BTB08N	XA9-99	XA10-99	1
BTB08N	XA11-99	XA12-99	1
BTB08N	XA13-49	XA14-68	1
BTB08N	XA15-88	XA16-27	1
BTB09N	XA5-44	XA6-69	1
BTB09N	XA7-10	XA8-48	1
BTB09N	XA9-15	XA10-15	1
BTB09N	XA11-15	XA12-15	1
BTB09N	XA13-48	XA14-10	1
BTB09N	XA15-84	XA16-69	1
BTB10N	XA5-96	XA6-64	1
BTB10N	XA7-71	XA8-103	1
BTB10N	XA9-98	XA10-98	1
BTB10N	XA11-98	XA12-98	1
BTB10N	XA13-103	XA14-71	1
BTB10N	XA15-86	XA16-64	1
BTB11N	XA5-37	XA6-84	1
BTB11N	XA7-77	XA8-47	1
BTB11N	XA9-71	XA10-71	1
BTB11N	XA11-71	XA12-71	1
BTB11N	XA13-47	XA14-77	1
BTB11N	XA15-79	XA16-84	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB12N	XA5-97	XA6-92	1
BTB12N	XA7-69	XA8-104	1
BTB12N	XA9-100	XA10-100	1
BTB12N	XA11-100	XA12-100	1
BTB12N	XA13-104	XA14-69	1
BTB12N	XA15-80	XA16-92	1
BTB13N	XA5-98	XA6-67	1
BTB13N	XA7-64	XA8-50	1
BTB13N	XA9-36	XA10-36	1
BTB13N	XA11-36	XA12-36	1
BTB13N	XA13-50	XA14-64	1
BTB13N	XA15-75	XA16-67	1
BTB14N	XA5-99	XA6-65	1
BTB14N	XA7-74	XA8-71	1
BTB14N	XA9-14	XA10-14	1
BTB14N	XA11-14	XA12-14	1
BTB14N	XA13-71	XA14-74	1
BTB14N	XA15-78	XA16-65	1
BTB15N	XA5-42	XA6-31	1
BTB15N	XA7-76	XA8-72	1
BTB15N	XA9-38	XA10-38	1
BTB15N	XA11-38	XA12-38	1
BTB15N	XA13-72	XA14-76	1
BTB15N	XA15-20	XA16-31	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTCLOCKA	XA5-105	XA5-63	1
BTENON	XA5-14	XA5-66	1
BTENON	XA5-17	XA15-77	1
BTEN1N	XA5-19	XA16-66	1
BTEN10N	XA5-83	XA12-88	1
BTEN11N	XA5-82	XA5-81	1
BTEN2N	XA5-76	XA5-13	1
BTEN3N	XA5-20	XA14-9	1
BTEN4N	XA5-22	XA6-66	1
BTEN5N	XA5-23	XA5-12	1
BTEN6N	XA5-18	XA7-9	1
BTEN7N	XA5-28	XA5-24	1
BTEN8N	XA5-80	XA10-88	1
BTEN9N	XA5-25	XA11-88	1
BTERRON	XA5-39	XA15-8	1
BTERR1N	XA5-93	XA16-7	1
BTERR10N	XA5-32	XA12-9	1
BTERR2N	XA5-35	XA13-7	1
BTERR3N	XA5-92	XA14-7	1
BTERR4N	XA5-34	XA6-7	1
BTERR5N	XA5-86	XA8-7	1
BTERR6N	XA5-87	XA7-7	1
BTERR7N	XA5-91	XA9-9	1
BTERR8N	XA5-30	XA10-9	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTERR9N	XA5-31	XA11-9	1
BTEST2N	XA5-36	XA5-78	1
BTFLTOUTN	J12-4	XA5-77	1
BTFLTSUMA	J12-3	XA5-40	1
BTGND	XA5-4	XA5-2	1
BTGND	XA5-74	XA5-10	1
BTLMTMEFN	XA5-15	XA5-9	1
BTLOIN	J12-8	XA5-75	1
BTPSVA	XA5-27	XA5-11	1
BTPSVA	XA5-103	XA5-88	1
BTSATLMYA	XA5-64	XA15-93	1
BTSLFTSTN	J12-7	XA5-38	1
GFHDMDTA	XA13-44	XA14-32	1
GFHEETA	XA14-41	XA14-8	1
GFHFALN	XA5-79	XA14-102	1
GFHGND	XA14-66	XA14-2	1
GFHGND	XA14-100	XA14-98	1
GFHGTFN	XA9-101	XA10-101	1
GFHGTFN	XA11-101	XA12-101	1
GFHGTFN	XA14-44	XA14-42	1
GFHIETA	XA14-43	XA14-11	1
GFHIRDN	XA13-34	XA14-48	1
GFHPMLDN	XA14-22	XA14-21	1
GFHSERA	XA13-23	XA14-39	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
GFHSTRA	XA14-45	XA14-35	1
GFHXMDZN	XA13-85	XA14-47	1
GFLDMOTA	XA7-32	XA8-44	1
GFLEETA	XA7-41	XA7-8	1
GFLFALN	XA5-89	XA7-102	1
GFLGND	XA7-66	XA7-2	1
GFLGND	XA7-101	XA7-98	1
GFLGTFN	XA6-17	XA7-42	1
GFLIETA	XA7-43	XA7-11	1
GFLIRDN	XA7-48	XA8-34	1
GFLPMLDN	XA7-22	XA7-21	1
GFLSERA	XA7-39	XA8-23	1
GFLSTRA	XA7-45	XA7-35	1
GFLXMDZN	XA7-47	XA8-85	1
GMHAVOWGND	J11-7	XA16-2	1
GMHAVOWINR	J11-5	XA16-10	1
GMHAVOWINS	J11-4	XA16-9	1
GMHAVOWOFF	J11-6	XA16-105	1
GMHAVOWOTR	J11-3	XA16-48	1
GMHAVOWOTS	J11-2	XA16-47	1
GMHAVOWOUT	XA6-75	XA16-45	1
GMHBBDATA	XA13-8	XA14-26	1
GMHCLKSELA	XA15-66	XA16-63	1
GMHDATA	XA16-40	XA16-8	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
GMHDPINR	J10-2	XA16-50	1
GMHDPINRA	XA16-106	XA16-111	1
GMHDPINS	XA16-46	XA16-34	1
GMHDPIN1S	J10-3	XA16-49	1
GMHDPOUTR	J10-5	XA16-12	1
GMHDPOUTS	XA16-11	XA16-5	1
GMHDPOUT1S	J10-6	XA16-3	1
GMHHLDATA	XA16-43	XA16-38	1
GMHRCCLK	XA15-63	XA16-42	1
GMHSMPA	XA16-39	XA16-33	1
GMLAVOWGND	J11-19	XA6-2	1
GMLAVOWINR	J11-17	XA6-10	1
GMLAVOWINS	J11-16	XA6-9	1
GMLAVOFF	J11-18	XA6-105	1
GMLAVOWOTR	J11-15	XA6-48	1
GMLAVOWOTS	J11-14	XA6-47	1
GMLAVOWOUT	XA6-45	XA16-75	1
GMLBBDATA	XA6-71	XA8-8	1
GMLDATA	XA6-40	XA6-8	1
GMLDPINR	J13-2	XA6-50	1
GMLDPINRA	XA6-106	XA6-111	1
GMLDPINS	J13-3	XA6-46	1
GMLDPOUTR	J13-11	XA6-12	1
GMLDPOUTS	J13-12	XA6-11	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
GMLGA	XA6-63	XA15-92	1
GMLGONA	XA7-38	XA13-43	1
GMLGONA	XA5-94	XA6-6	1
GMLHLDATA	XA6-43	XA6-38	1
GMLSMPA	XA6-39	XA6-33	1
LM1ADATA	XA9-33	XA13-102	1
LM1ADPINR	J8-14	XA9-48	1
LM1ADPINS	J8-6	XA9-105	1
LML1ADPOUTR	J8-15	XA9-104	1
LM1ADPOUTS	J8-7	XA9-103	1
LM1AHLDATA	XA9-47	XA9-39	1
LM1BDATA	XA9-32	XA13-36	1
LM1BDPINR	J8-16	XA9-66	1
LM1BDPINS	J8-8	XA9-65	1
LM1BDPOUTR	J8-17	XA9-63	1
LM1BDPOUTS	J8-9	XA9-64	1
LM1BHLDATA	XA9-67	XA19-62	1
LM1GND	XA9-24	XA9-2	1
LM2ADATA	XA10-33	XA13-94	1
LM2ADPINR	J8-10	XA10-48	1
LM2ADPINS	J8-2	XA10-105	1
LM2ADPOUTR	J8-11	XA10-104	1
LM2ADPOUTS	J8-3	XA10-103	1
LM2AHLDATA	XA10-47	XA10-39	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
LM2BDATA	XA10-32	XA13-37	1
LM2BDPINR	J8-12	XA10-66	1
LM2BDPINS	J8-4	XA10-65	1
LM2BDPOUTR	J8-13	XA10-63	1
LM2BDPOUTS	J8-5	XA10-64	1
LM2BHLDATA	XA10-67	XA10-62	1
LM2GND	XA10-24	XA10-2	1
LM3ADATA	XA11-33	XA13-93	1
LM3ADPINR	J9-14	XA11-48	1
LM3ADPINS	J9-6	XA11-105	1
LM3ADPOUTR	J9-15	XA11-104	1
LM3ADPOUTS	J9-7	XA11-103	1
LM3AHLDATA	XA11-47	XA11-39	1
LM3BDATA	XA11-32	XA13-95	1
LM3BDPINR	J9-16	XA11-66	1
LM3BDPINS	J9-8	XA11-65	1
LM3BDPOUTR	J9-17	XA11-63	1
LM3BDPOUTS	J9-9	XA11-64	1
LM3BHLDATA	XA11-67	XA11-62	1
LM3GND	XA11-24	XA11-2	1
LM4ADATA	XA12-33	XA13-39	1
LM4ADPINR	J9-10	XA12-48	1
LM4ADPINS	J9-2	XA12-105	1
LM4ADPOUTR	J9-11	XA12-104	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
LM4ADPOUTS	J9-3	XA12-103	1
LM4AHLDATA	XA12-47	XA12-39	1
LM4BDATA	XA12-32	XA13-38	1
LM4BDPINR	J9-12	XA12-66	1
LM4BDPINS	J9-4	XA12-65	1
LM4BDPOUTR	J9-13	XA12-63	1
LM4BDPOUTS	J9-5	XA12-64	1
LM4BHLDATA	XA12-67	XA12-62	1
LM4GND	XA12-24	XA12-2	1
MDHDATA	XA13-29	XA16-16	1
MDHDEZA	XA13-25	XA14-34	1
MDHEFA	XA13-24	XA13-69	1
MDHFREFA	XA13-70	XA14-25	1
MDHGND	XA13-6	XA13-2	1
MDHGND	XA13-26	XA13-9	1
MDHOT01A	XA9-82	XA13-77	1
MDHOT02A	XA9-89	XA13-78	1
MDHOT03A	XA10-82	XA13-79	1
MDHOT04A	XA10-89	XA13-80	1
MDHOT05A	XA11-82	XA13-81	1
MDHOT06A	XA11-89	XA13-22	1
MDHOT07A	XA12-82	XA13-20	1
MDHOT08A	XA12-89	XA13-21	1
MDHOT09A	XA8-36	XA13-73	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
MDHOT10A	XA8-102	XA13-74	1
MDHOT11A	XA8-37	XA13-75	1
MDHOT12A	XA8-94	XA13-76	1
MDHOT13A	XA8-95	XA13-19	1
MDHOT14A	XA8-93	XA13-18	1
MDHOT15A	XA8-38	XA13-17	1
MDHOT16A	XA8-39	XA13-16	1
MDHSC4	XA13-4	XA14-30	1
MDHSC5	XA13-3	XA14-94	1
MDHSC6	XA8-86	XA13-64	1
MDHSC7	XA8-31	XA13-65	1
MDHSC8	XA13-68	XA15-97	1
MDLDATA	XA6-16	XA8-29	1
MDLDEZA	XA7-34	XA8-25	1
MDLEFA	XA8-24	XA8-69	1
MDLFREFA	XA7-25	XA8-70	1
MDLGND	XA8-6	XA8-2	1
MDLGND	XA8-40	XA8-26	1
MDLGND	XA8-42	XA8-41	1
MDLGND	XA8-45	XA8-43	1
MDLGND	XA8-91	XA8-46	1
MDLGND	XA8-97	XA8-96	1
MDLGND	XA8-99	XA8-98	1
MDLGND	XA8-106	XA8-105	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
MDLOGSA	XA8-35	XA8-84	1
MDLOT01A	XA8-77	XA13-99	1
MDLOT02A	XA8-78	XA13-40	1
MDLOT03A	XA8-79	XA13-41	1
MDLOT04A	XA8-80	XA13-42	1
MDLOT05A	XA8-81	XA13-98	1
MDLOT06A	XA8-22	XA13-91	1
MDLOT07A	XA8-20	XA13-96	1
MDLOT08A	XA8-21	XA13-97	1
MDLSC5	XA7-30	XA8-3	1
MDLSC6	XA8-64	XA13-90	1
MDLSC7	XA7-94	XA8-65	1
MDLSC8	XA8-68	XA13-86	1
SALARMA	J11-22	J12-6	1
SALARMN	J11-21	J12-5	1
SALMA	J11-9	J12-2	1
TGFBGA	XA15-19	XA15-12	1
TGGND	XA15-103	XA15-2	1
TGHGA	XA15-21	XA16-73	1
TGHGA	XA13-32	XA14-106	1
TGHTLDTOA	XA13-89	XA13-83	1
TGH2GA	XA15-22	XA16-72	1
TGH8GA	XA15-17	XA16-36	1
TGLGA	XA6-73	XA15-23	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
TGLGA	XA7-106	XA8-32	1
TGL2GA	XA6-72	XA8-82	1
TGL8GA	XA6-36	XA15-29	1
TGPBA	XA13-12	XA15-96	1
TGPCA	XA13-15	XA15-44	1
TGPEA	XA13-14	XA15	1
TGPFA	XA13-11	XA15-106	1
TGPGA	XA8-15	XA8-12	1
TGPHA	XA8-14	XA15-100	1
TGPJA	XA13-45	XA15-105	1
TGPKA	XA13-105	XA15-35	1
TGPLA	XA13-106	XA15-38	1
TGPNA	XA8-92	XA8-9	1
TGPNA	XA7-100	XA7-99	1
TGPNA	XA13-92	XA15-95	1
TGPUP1A	XA13-30	XA15-50	1
TGPUP2A	XA13-31	XA14-38	1
TGPUP2A	XA14-99	XA15-49	1
TGPUP3A	XA5-65	XA8-11	1
TGPUP3A	XA8-83	XA8-30	1
TGPUP3A	XA8-90	XA8-87	1
TGRMCS2A	XA15-41	XA15-37	1
TGSALMA	J12-1	XA15-45	1
TGSALMN	J11-23	XA15-46	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
TGSTACLK	XA15-91	XA15-14	1
TGSTACLKA	J11-10	XA15-89	1
TGSTACLKN	J11-11	XA15-90	1
TGS1A	XA15-31	XA15-7	1
TG1PPSA	XA9-86	XA10-86	1
TG1PPSA	XA11-86	XA12-86	1
TG150HN	XA15-94	XA15-87	1
TG150HN	XA7-50	XA14-50	1
TG16A	XA14-103	XA15-25	1
TG18432A	XA15-67	XA15-65	1
TG32A	XA7-17	XA14-17	1
TG32XA	XA13-88	XA13-84	1
TG32XA	XA8-88	XA9-12	1
TG32XA	XA10-12	XA11-12	1
TG32XA	XA12-12	XA15-26	1
TG4096/2	XA15-102	XA15-70	1
TG512XA	XA12-45	XA15-85	1
TG512XA	XA10-45	XA11-45	1
TG64XA	XA9-72	XA10-72	1
TG64XA	XA11-72	XA12-72	1

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB00N	XA6-30	XA7-70	2
BTB00N	XA8-66	XA9-94	2
BTB00N	XA10-94	XA11-94	2
BTB00N	XA12-94	XA13-66	2
BTB00N	XA14-70	XA15-81	2
BTB01N	XA6-26	XA7-73	2
BTB01N	XA8-10	XA9-77	2
BTB01N	XA10-77	XA11-77	2
BTB01N	XA12-77	XA13-10	2
BTB01N	XA14-73	XA15-27	2
BTB02N	XA6-28	XA7-72	2
BTB02N	XA8-13	XA9-97	2
BTB02N	XA10-97	XA11-97	2
BTB02N	XA12-97	XA13-13	2
BTB02N	XA14-72	XA15-28	2
BTB03N	XA6-13	XA7-75	2
BTB03N	XA8-67	XA9-37	2
BTB03N	XA10-37	XA11-37	2
BTB03N	XA12-37	XA13-67	2
BTB03N	XA14-75	XA15-76	2
BTB04N	XA9-92	XA10-92	2
BTB04N	XA11-92	XA12-92	2
BTB05N	XA9-93	XA10-93	2
BTB05N	XA11-93	XA12-93	2

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB06N	XA9-73	XA10-73	2
BTB06N	XA11-73	XA12-73	2
BTB07N	XA9-78	XA10-78	2
BTB07N	XA11-78	XA12-78	2
BTB08N	XA6-27	XA7-68	2
BTB08N	XA8-49	XA9-99	2
BTB08N	XA10-99	XA11-99	2
BTB08N	XA12-99	XA13-49	2
BTB08N	XA14-68	XA15-88	2
BTB09N	XA6-69	XA7-10	2
BTB09N	XA8-48	XA9-15	2
BTB09N	XA10-15	XA11-15	2
BTB09N	XA12-15	XA13-48	2
BTB09N	XA14-10	XA15-84	2
BTB10N	XA6-64	XA7-71	2
BTB10N	XA8-103	XA9-98	2
BTB10N	XA10-98	XA11-98	2
BTB10N	XA12-98	XA13-103	2
BTB10N	XA14-71	XA15-86	2
BTB11N	XA6-84	XA7-77	2
BTB11N	XA8-47	XA9-71	2
BTB11N	XA10-71	XA11-71	2
BTB11N	XA12-77	XA13-47	2
BTB11N	XA14-77	XA15-79	2

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTB12N	XA6-92	XA7-69	2
BTB12N	XA8-104	XA9-100	2
BTB12N	XA10-100	XA11-100	2
BTB12N	XA12-100	XA13-104	2
BTB12N	XA14-69	XA15-80	2
BTB13N	XA6-67	XA7-64	2
BTB13N	XA8-50	XA9-36	2
BTB13N	XA10-36	XA11-36	2
BTB13N	XA12-36	XA13-50	2
BTB13N	XA14-64	XA15-75	2
BTB14N	XA6-65	XA7-74	2
BTB14N	XA8-71	XA9-14	2
BTB14N	XA10-14	XA11-14	2
BTB14N	XA12-14	XA13-71	2
BTB14N	XA14-74	XA15-78	2
BTB15N	XA6-31	XA7-76	2
BTB15N	XA8-72	XA9-38	2
BTB15N	XA10-38	XA11-38	2
BTB15N	XA12-38	XA13-72	2
BTB15N	XA14-76	XA15-20	2
BTENON	XA5-17	XA5-14	2
BTEN11N	XA5-104	XA5-82	2
BTEN2N	XA5-76	XA13-33	2
BTEN3N	XA5-84	XA5-20	2

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
BTEN5N	XA5-23	XA8-33	2
BTEN6N	XA5-26	XA5-18	2
BTEN7N	XA5-28	XA9-88	2
BTGND	XA5-10	XA5-4	2
BTGND	XA5-95	XA5-74	2
BTLMTMEFN	XA5-16	XA5-15	2
BTPSVA	XA5-88	XA5-27	2
BTPSVA	XA5-48	XA5-103	2
GFHGND	XA14-98	XA14-66	2
GFHGND	XA14-101	XA14-100	2
GFHGTFN	XA10-101	XA11-101	2
GFHGTFN	XA12-101	XA14-42	2
GFHGTFN	XA14-44	XA16-17	2
GFLGND	XA7-98	XA7-66	2
GFLGTFN	XA7-44	XA7-42	2
GMHBBDATA	XA14-26	XA16-71	2
GMHCLKSELA	XA15-13	XA15-66	2
GMHDPINR	XA16-55	XA16-50	2
GMHDPIN1S	E5-1	XA16-49	2
GMHDPOUT1S	E1-1	XA16-3	2
GMLBBDATA	XA6-71	XA7-26	2
GMLDPINR	XA6-55	XA6-50	2
GMLGONA	XA6-6	XA13-43	2
LM1GND	XA9-46	XA9-24	2

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
LM2GND	XA10-46	XA10-24	2
LM3GND	XA11-46	XA11-24	2
LM4GND	XA12-46	XA12-24	2
MDHEFA	XA13-24	XA14-23	2
MDHGND	XA13-9	XA13-6	2
MDHGND	XA13-46	XA13-26	2
MDHSC7	XA8-89	XA8-31	2
MDLEFA	XA7-23	XA8-24	2
MDLGND	XA8-26	XA8-6	2
MDLGBD	XA8-41	XA8-40	2
MDLGND	XA8-43	XA8-42	2
MDLGND	XA8-46	XA8-45	2
MDLGND	XA8-96	XA8-91	2
MDLGND	XA8-98	XA8-97	2
MDLGND	XA8-105	XA8-99	2
MDLSC7	XA7-94	XA13-87	2
TGHGA	XA13-32	XA15-21	2
TGHTLDTOA	XA13-89	XA15-39	2
TGH2GA	XA13-82	XA15-22	2
TGLGA	XA6-73	XA8-32	2
TGL2GA	XA8-82	XA15-24	2
TGPGA	XA8-15	XA15-104	2
TGPNA	XA7-99	XA8-92	2
TGPNA	XA7-100	XA13-92	2

WIRE DATA LIST

SIGNAL NAME	FROM MOD/PIN	TO MOD/PIN	Z (LVL)
TGPUP2A	XA14-99	XA14-38	2
TGPUP3A	XA8-30	XA8-11	2
TGPUP3A	XA8-87	XA8-83	2
TGPUP3A	XA8-90	XA15-48	2
TG1PPSA	XA10-86	XA11-86	2
TG1PPSA	XA12-86	XA15-99	2
TG150HN	XA14-50	XA15-94	2
TG16A	XA7-103	XA14-103	2
TG32A	XA14-17	XA15-82	2
TG32XA	XA8-88	XA13-88	2
TG32XA	XA9-12	XA10-12	2
TG32XA	XA11-12	XA12-12	2
TG512XA	XA11-45	XA12-45	2
TG512XA	XA9-45	XA10-45	2
TG64XA	XA10-72	XA11-72	2
TG64XA	XA12-72	XA15-83	2

GLOSSARY

Word	Meaning
Analog Applique	Data sources and control functions that are randomly time-related to each other.
Bridge	To connect more than one voice channel together.
Channel	Individual signals which are multiplexed to form a group.
Clock	A source of timing signals.
Comparator	A device used to compare two signals and output the difference.
Conditioned Diphase	A waveform for data transmission designed for simple timing extraction.
Converter	A device used to change a signal from one form to another.
Crowbar	A circuit which shuts down the power supply voltage in response to a fault input.
Data	Any or all facts, numbers, letters, symbols, or information that can be processed or produced by a computer.
Data Stream	All data transmitted through a path in a single input or output operation.
Demodulation	The process of removing the modulated carrier from the data.
Demultiplex	The process by which one data stream is separated into two or more independent signals.
Duplex	Simultaneous two way data flow.
Energize	To activate or turn on.
Faults	Error or indication that something is wrong with the equipment.
Format	The way in which the data is arranged on the bit stream.
Frame	The array of bits between two frame bits.
Gate	To permit a signal to pass through a circuit which has the capability of blocking or passing the signal in response to a control.

GLOSSARY—Continued

Word	Meaning
High Group	A data stream which consists of a low group data stream multiplexed together with local DSVTs or analog phones. This high group is outputted to other DGM multiplexers.
Low Group	A data stream consisting of up to eight subchannels multiplexed together. The subchannels take data from, or output it to, RLGMs or other RMCs.
Modem	A modulation/demodulation device that: 1. Takes signals from sources such as multiplexers and generates waveforms suitable to the transmission medium. 2. Takes signals from the transmission medium and converts that to a form suitable for data processing in demultiplexers.
Modulation	The process of superimposing a data stream on a carrier for transmission purposes.
Multiplexer	A device used to combine two or more signals for transmission over a single channel.
Nonreturn to Zero	A signal having two states termed zero and one, and no neutral or reset condition.
Orderwire	A circuit used by maintenance to communicate between facilities.
Oscillator	A device which generates an alternating current waveshape at a determined frequency.
Overhead	A space allocated in the frame period for the insertion of alarm signals and other local data.
Phase Locked Loop	Locks the time relationship of two signals to a predetermined fixed condition.
Ramp Voltage	A voltage waveform that increases or decreases approximately linearly with time.
Rectified Ac	Ac current which has been converted into pulsating dc.
Retime	To realign to the original timing.
Soft Start Signal	A control that delays output of the 150 Vdc supply until all low voltage supplies are up to voltage.

GLOSSARY—Continued

Word	Meaning
Synchronous	Having a regular timing pattern.
Timing	A signal used to identify bits in a digital stream.
Transition	A point in time where a signal begins to change polarity.

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3-10	3-3		3-1	Item 5, Function column. Change "2 dB" to "3 dB." REASON: The adjustment procedure the TRANS POWER FAULT indicator calls for a 3 dB (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC" to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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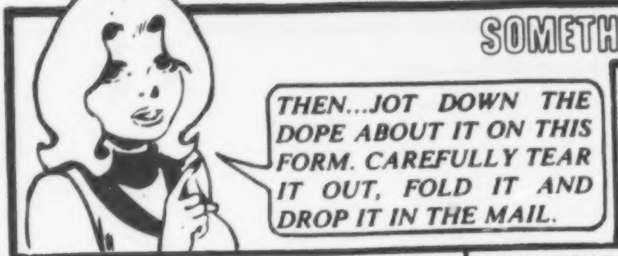
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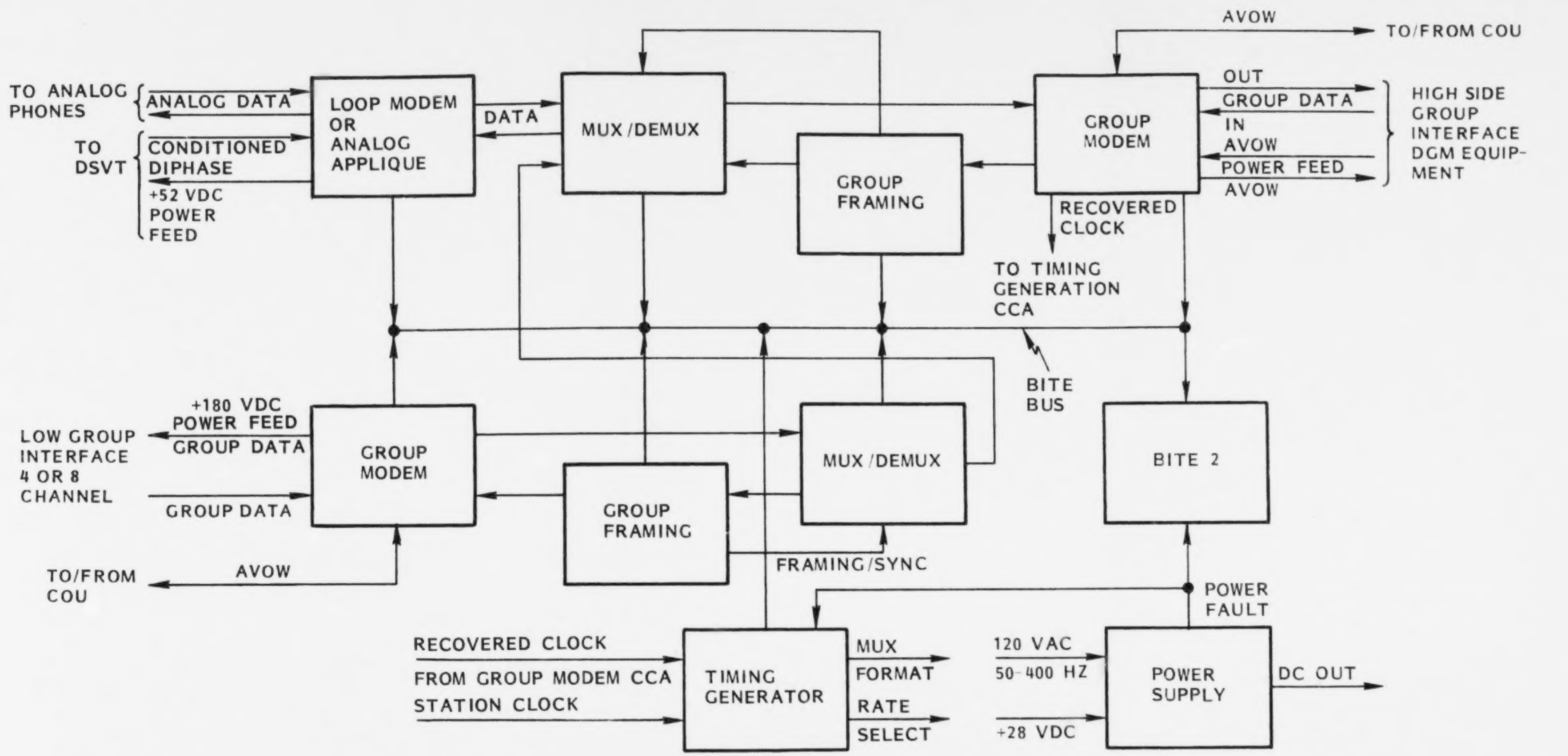

AVOW
TO/FROM COU
TO ANALOG PHONES
ANALOG DATA
TO DSVT
CONDITIONED DIPHASE
+52 VDC POWER FEED
LOOP MODEM OR ANALOG APPLIQUE
DATA
MUX/DEMUX
GROUP FRAMING
GROUP MODEM
OUT
GROUP DATA
IN
AVOW
POWER FEED
AVOW
HIGH SIDE GROUP INTERFACE DGM EQUIPMENT
RECOVERED CLOCK
TO TIMING GENERATION CCA
BITE BUS
+180 VDC POWER FEED
LOW GROUP INTERFACE 4 OR 8 CHANNEL
GROUP DATA
GROUP DATA
GROUP MODEM
GROUP FRAMING
MUX/DEMUX
BITE 2
FRAMING/SYNC
TO/FROM COU
AVOW
POWER FAULT
RECOVERED CLOCK
FROM GROUP MODEM CCA
STATION CLOCK
TIMING GENERATOR
MUX FORMAT
RATE SELECT
120 VAC
50-400 HZ
+28 VDC
POWER SUPPLY
DC OUT

EL1WL063

Figure FO-1. RMC Functional Block Diagram

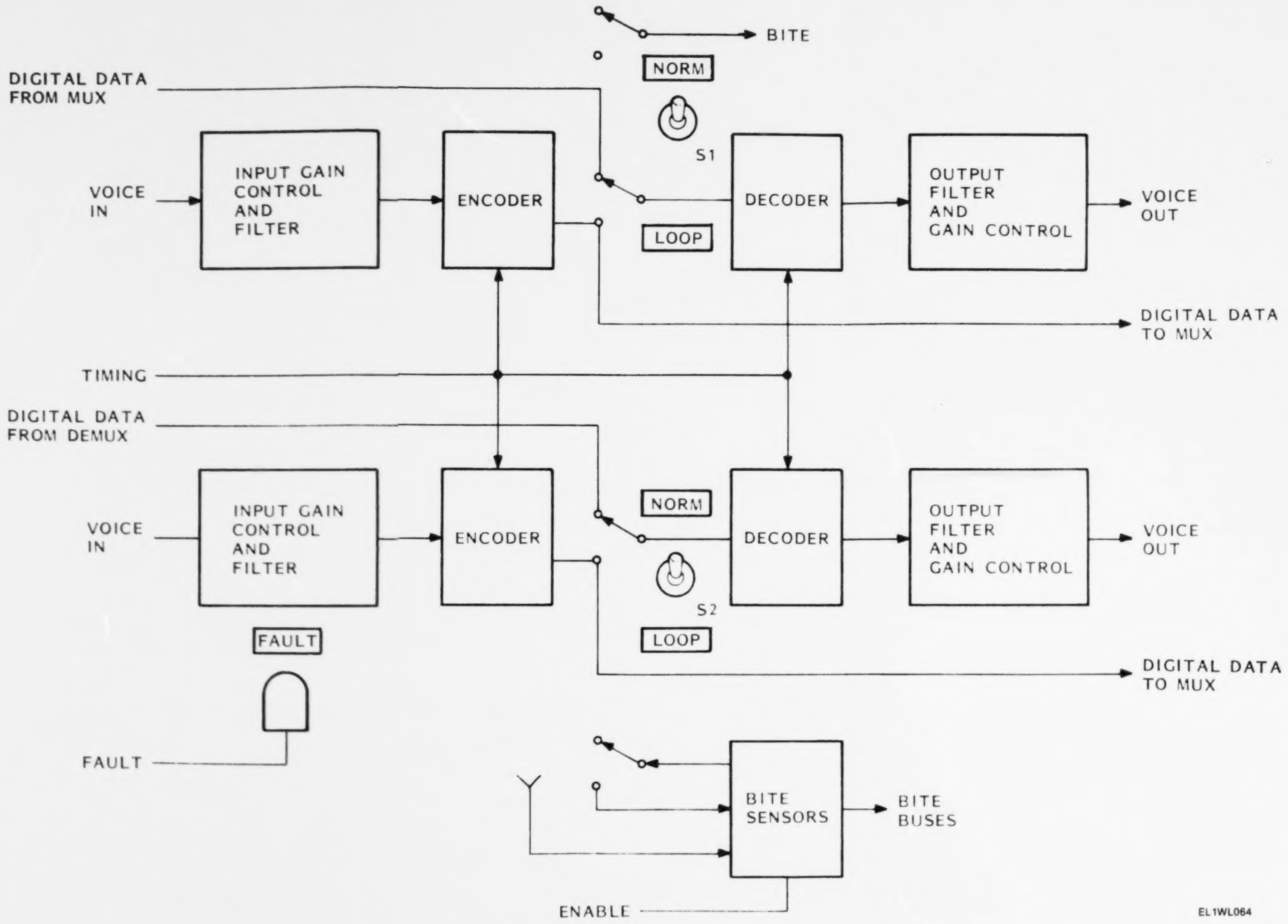

BITE
NORM
DIGITAL DATA FROM MUX
S1
VOICE IN
INPUT GAIN CONTROL AND FILTER
ENCODER
DECODER
OUTPUT FILTER AND GAIN CONTROL
VOICE OUT
LOOP
DIGITAL DATA TO MUX
TIMING
DIGITAL DATA FROM DEMUX
VOICE IN
INPUT GAIN CONTROL AND FILTER
ENCODER
NORM
DECODER
OUTPUT FILTER AND GAIN CONTROL
VOICE OUT
S2
LOOP
FAULT
DIGITAL DATA TO MUX
FAULT
BITE SENSORS
BITE BUSES
ENABLE
EL1WL064

Figure FO-2. Analog Applique Block Diagram

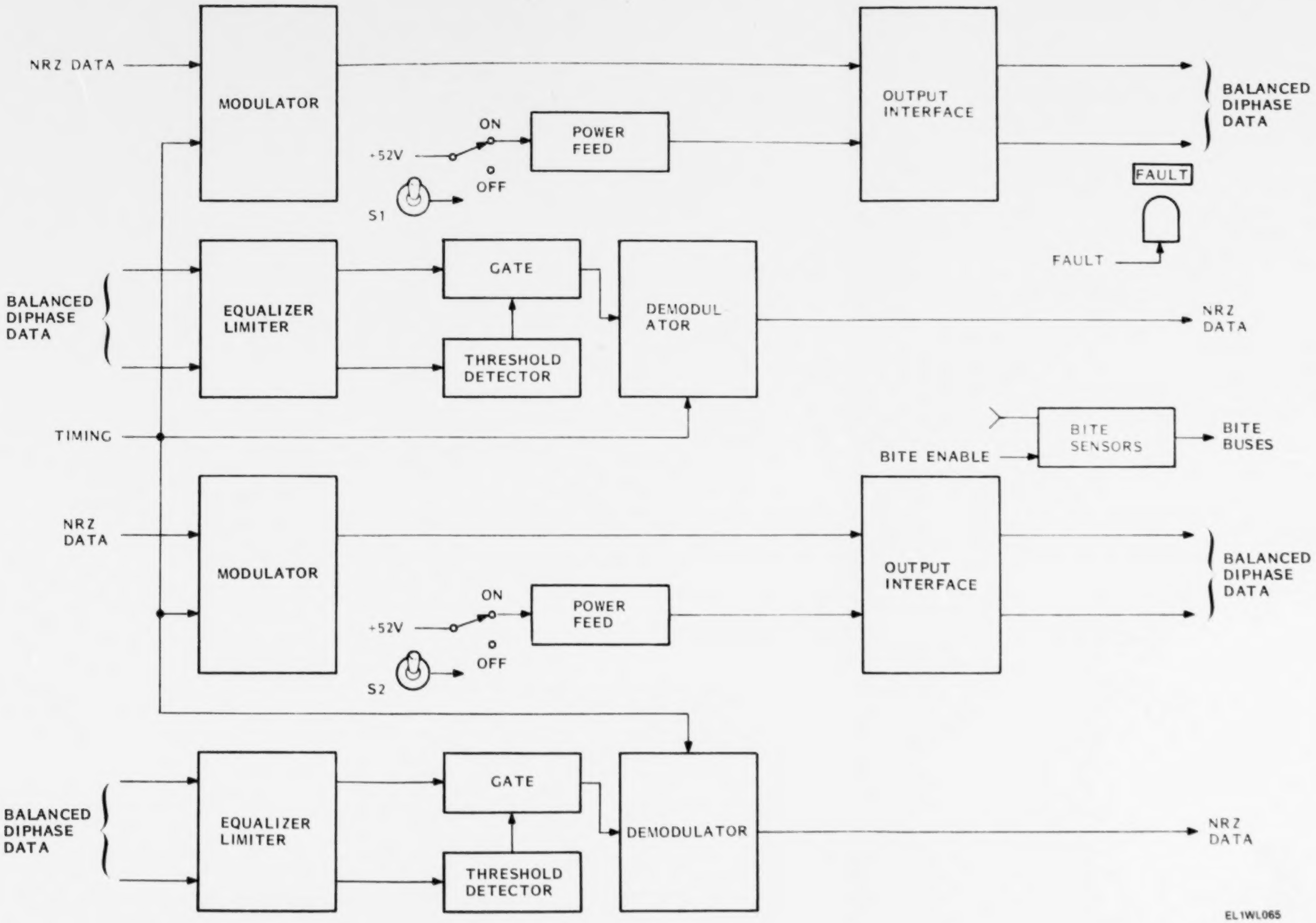

NRZ DATA
MODULATOR
OUTPUT INTERFACE
BALANCED DIPHASE DATA
ON
+52V
POWER FEED
OFF
S1
FAULT
FAULT
BALANCED DIPHASE DATA
EQUALIZER LIMITER
GATE
THRESHOLD DETECTOR
DEMODULATOR
NRZ DATA
TIMING
BITE SENSORS
BITE ENABLE
BITE BUSES
NRZ DATA
MODULATOR
ON
+52V
POWER FEED
OFF
S2
OUTPUT INTERFACE
BALANCED DIPHASE DATA
BALANCED DIPHASE DATA
EQUALIZER LIMITER
GATE
THRESHOLD DETECTOR
DEMODULATOR
NRZ DATA
EL1WL065

Figure FO-3. Loop Modem Block Diagram

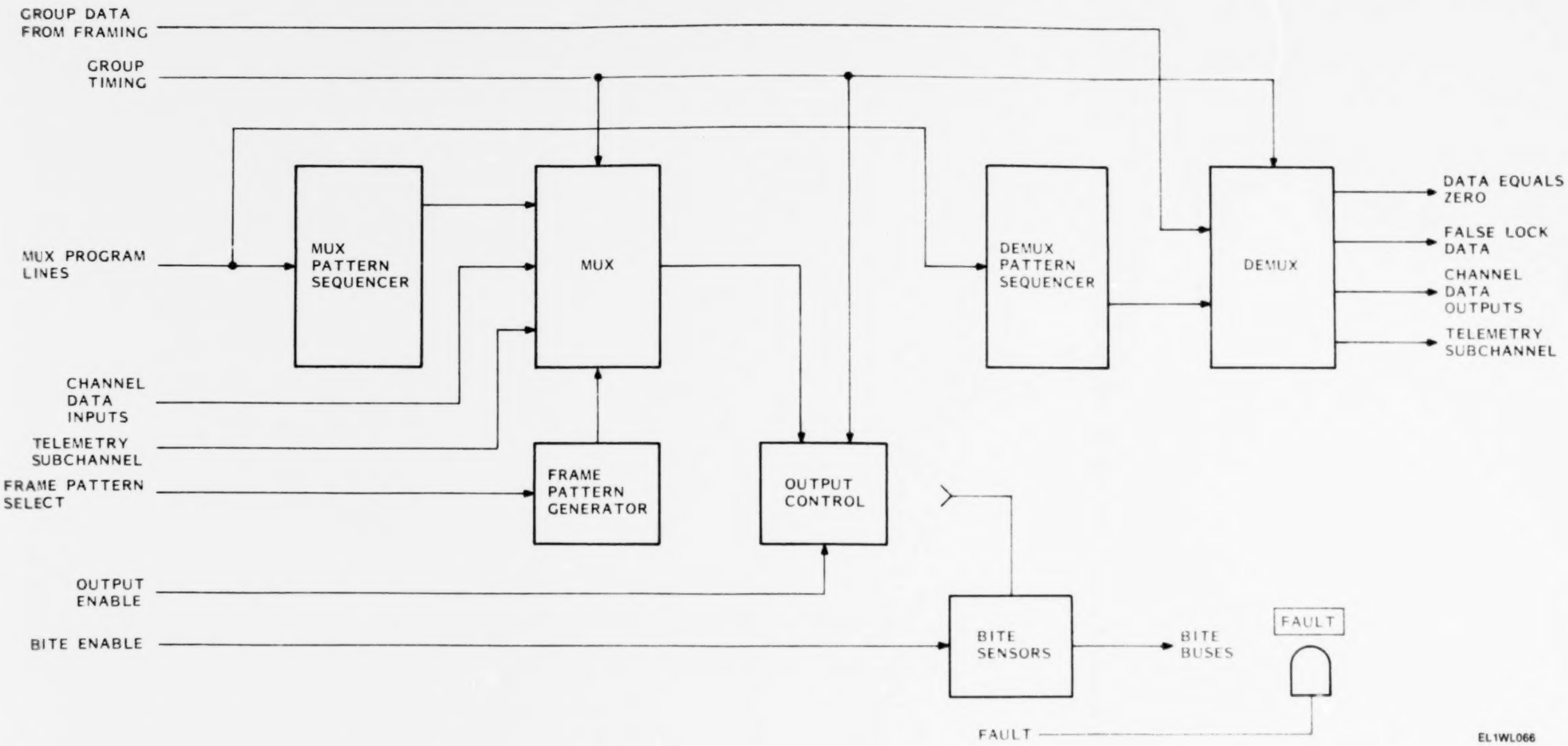

GROUP DATA FROM FRAMING
GROUP TIMING
MUX PROGRAM LINES
MUX PATTERN SEQUENCER
MUX
DEMUX PATTERN SEQUENCER
DEMUX
DATA EQUALS ZERO
FALSE LOCK DATA
CHANNEL DATA OUTPUTS
TELEMETRY SUBCHANNEL
CHANNEL DATA INPUTS
TELEMETRY SUBCHANNEL
FRAME PATTERN SELECT
FRAME PATTERN GENERATOR
OUTPUT CONTROL
OUTPUT ENABLE
BITE ENABLE
BITE SENSORS
BITE BUSES
FAULT
FAULT
EL1WL066

Figure FO-4. Multiplexer/Demultiplexer Block Diagram

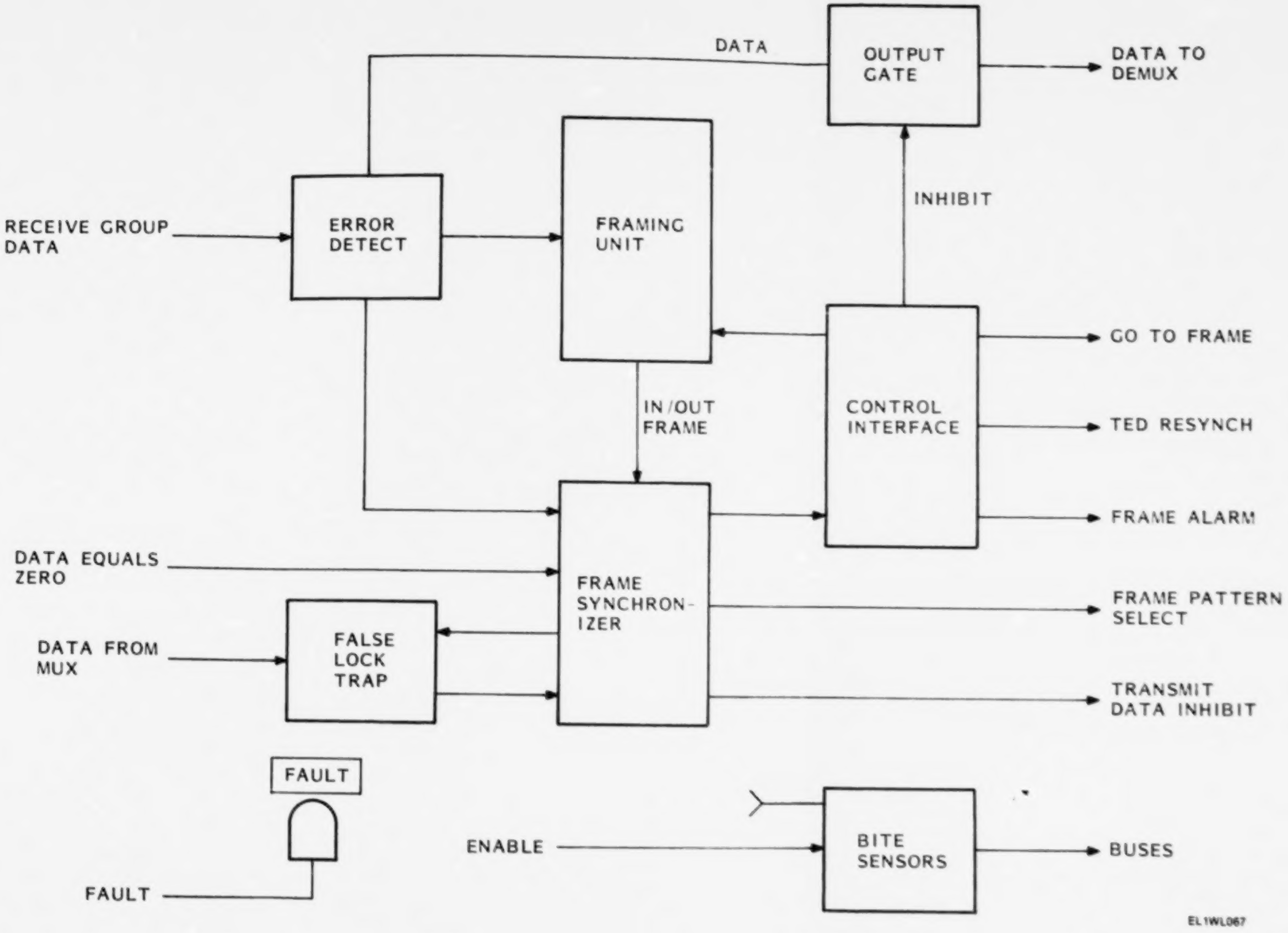
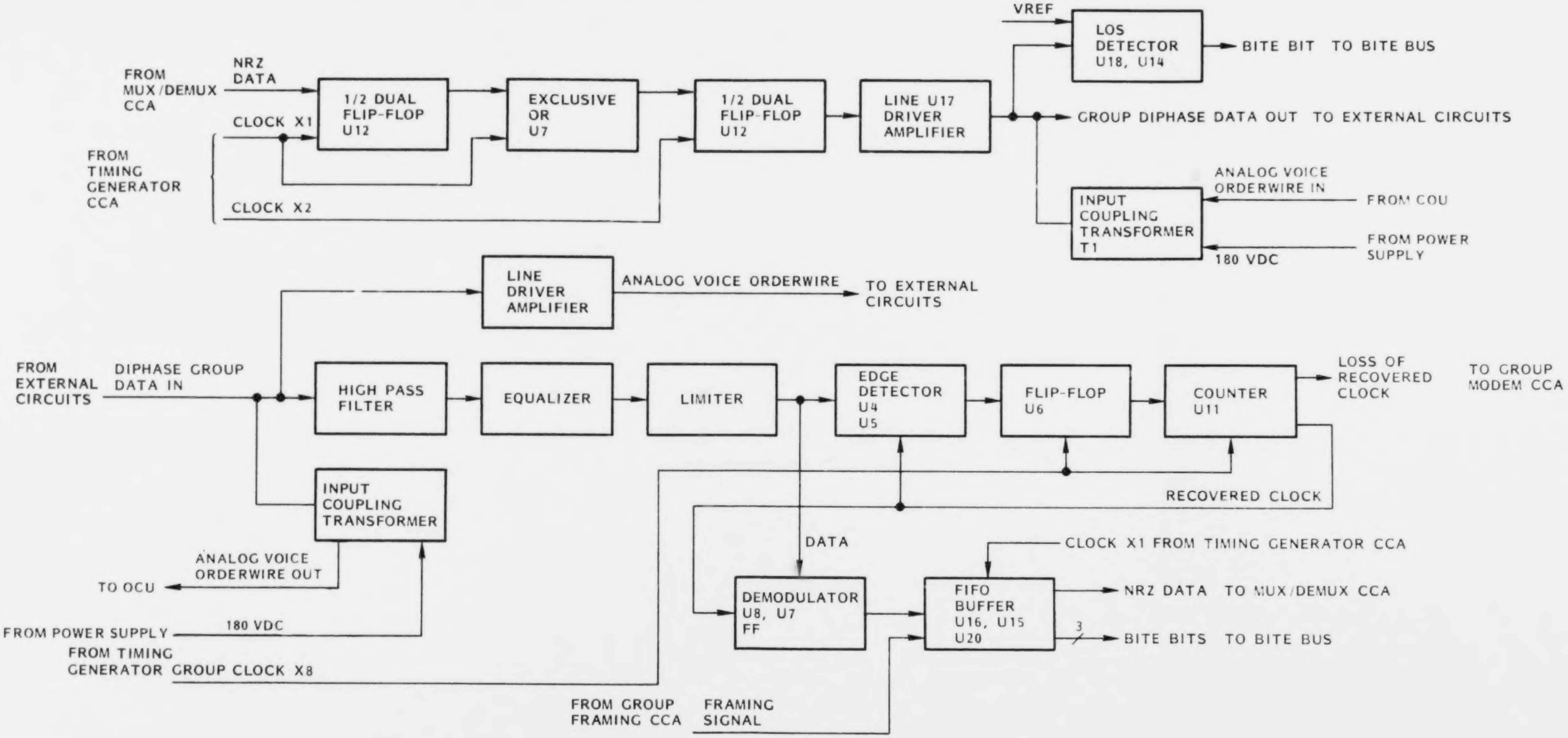

DATA
OUTPUT GATE
DATA TO DEMUX
RECEIVE GROUP DATA
ERROR DETECT
FRAMING UNIT
INHIBIT
CONTROL INTERFACE
GO TO FRAME
TED RESYNCH
FRAME ALARM
IN/OUT FRAME
DATA EQUALS ZERO
FRAME SYNCHRONIZER
FRAME PATTERN SELECT
DATA FROM MUX
FALSE LOCK TRAP
TRANSMIT DATA INHIBIT
FAULT
FAULT
ENABLE
BITE SENSORS
BUSES
EL1WL067

Figure FO-5. Group Framing Block Diagram


VREF
LOS DETECTOR U18, U14
BITE BIT TO BITE BUS
FROM MUX/DEMUX CCA
NRZ DATA
1/2 DUAL FLIP-FLOP U12
EXCLUSIVE OR U7
1/2 DUAL FLIP-FLOP U12
LINE U17 DRIVER AMPLIFIER
GROUP DIPHASE DATA OUT TO EXTERNAL CIRCUITS
CLOCK X1
FROM TIMING GENERATOR CCA
CLOCK X2
ANALOG VOICE ORDERWIRE IN
FROM COU
INPUT COUPLING TRANSFORMER T1
FROM POWER SUPPLY
180 VDC
LINE DRIVER AMPLIFIER
ANALOG VOICE ORDERWIRE
TO EXTERNAL CIRCUITS
FROM EXTERNAL CIRCUITS
DIPHASE GROUP DATA IN
HIGH PASS FILTER
EQUALIZER
LIMITER
EDGE DETECTOR U4 U5
FLIP-FLOP U6
COUNTER U11
LOSS OF RECOVERED CLOCK
TO GROUP MODEM CCA
RECOVERED CLOCK
INPUT COUPLING TRANSFORMER
DATA
CLOCK X1 FROM TIMING GENERATOR CCA
ANALOG VOICE ORDERWIRE OUT
TO OCU
DEMODULATOR U8, U7 FF
FIFO BUFFER U16, U15 U20
NRZ DATA TO MUX/DEMUX CCA
3
BITE BITS TO BITE BUS
FROM POWER SUPPLY
180 VDC
FROM TIMING GENERATOR GROUP CLOCK X8
FROM GROUP FRAMING CCA
FRAMING SIGNAL

EL1WL068

Figure FO-6. Group Modem Block Diagram

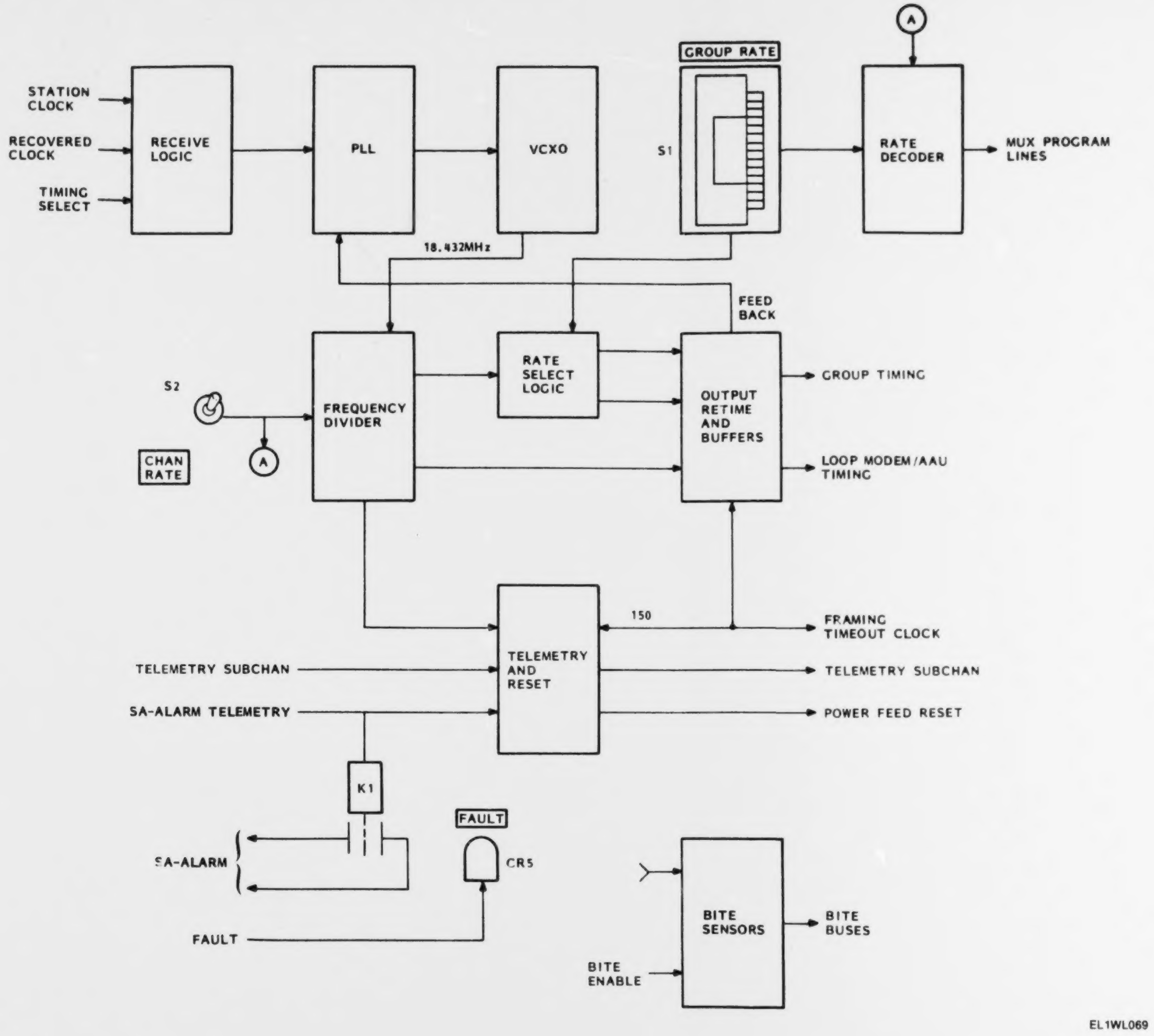

A
GROUP RATE
STATION CLOCK
RECOVERED CLOCK
TIMING SELECT
RECEIVE LOGIC
PLL
VCXO
S1
RATE DECODER
MUX PROGRAM LINES
18.432MHz
FEED BACK
S2
CHAN RATE
A
FREQUENCY DIVIDER
RATE SELECT LOGIC
OUTPUT RETIME AND BUFFERS
GROUP TIMING
LOOP MODEM/AAU TIMING
150
FRAMING TIMEOUT CLOCK
TELEMETRY SUBCHAN
SA-ALARM TELEMETRY
TELEMETRY AND RESET
TELEMETRY SUBCHAN
POWER FEED RESET
K1
FAULT
SA-ALARM
CR5
FAULT
BITE SENSORS
BITE BUSES
BITE ENABLE
EL1WL069

Figure FO-7. Timing Generator Block Diagram

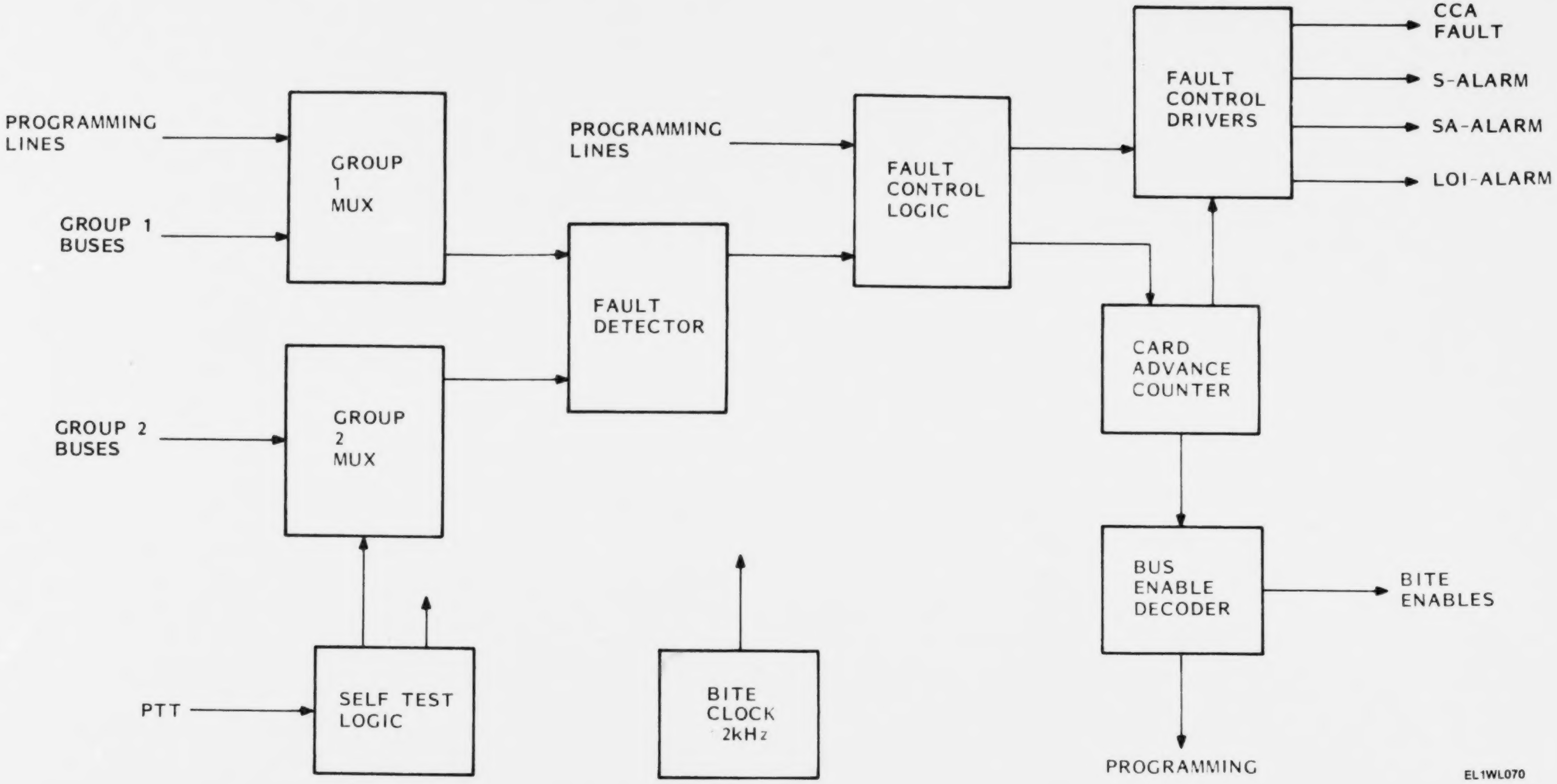

PROGRAMMING LINES
GROUP 1 BUSES
GROUP 1 MUX
GROUP 2 BUSES
GROUP 2 MUX
PTT
SELF TEST LOGIC
FAULT DETECTOR
BITE CLOCK 2kHz
PROGRAMMING LINES
FAULT CONTROL LOGIC
FAULT CONTROL DRIVERS
CCA FAULT
S-ALARM
SA-ALARM
LOI-ALARM
CARD ADVANCE COUNTER
BUS ENABLE DECODER
BITE ENABLES
PROGRAMMING
EL1WL070

Figure FO-8. BITE 2
Block Diagram

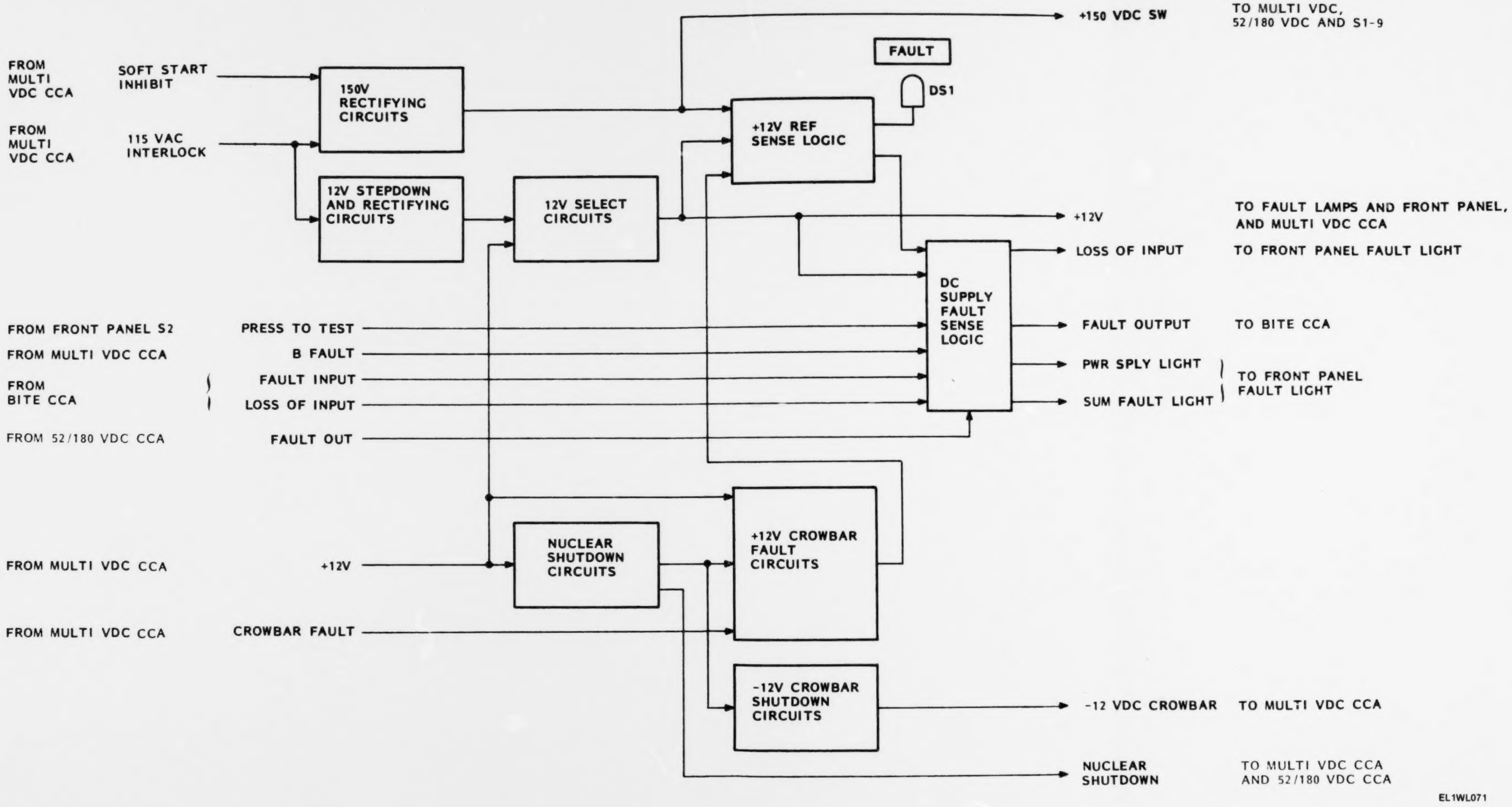

+150 VDC SW
TO MULTI VDC, 52/180 VDC AND S1-9
FAULT
DS1
FROM MULTI VDC CCA
SOFT START INHIBIT
150V RECTIFYING CIRCUITS
+12V REF SENSE LOGIC
FROM MULTI VDC CCA
115 VAC INTERLOCK
12V STEPDOWN AND RECTIFYING CIRCUITS
12V SELECT CIRCUITS
+12V
TO FAULT LAMPS AND FRONT PANEL, AND MULTI VDC CCA
LOSS OF INPUT
TO FRONT PANEL FAULT LIGHT
DC SUPPLY FAULT SENSE LOGIC
FROM FRONT PANEL S2
PRESS TO TEST
FAULT OUTPUT
TO BITE CCA
FROM MULTI VDC CCA
B FAULT
PWR SPLY LIGHT
FROM BITE CCA
FAULT INPUT
TO FRONT PANEL FAULT LIGHT
LOSS OF INPUT
SUM FAULT LIGHT
FROM 52/180 VDC CCA
FAULT OUT
NUCLEAR SHUTDOWN CIRCUITS
+12V CROWBAR FAULT CIRCUITS
FROM MULTI VDC CCA
+12V
FROM MULTI VDC CCA
CROWBAR FAULT
-12V CROWBAR SHUTDOWN CIRCUITS
-12 VDC CROWBAR
TO MULTI VDC CCA
NUCLEAR SHUTDOWN
TO MULTI VDC CCA AND 52/180 VDC CCA
EL1WL071

Figure FO-9. Power Supply Ac Input CCA Block Diagram

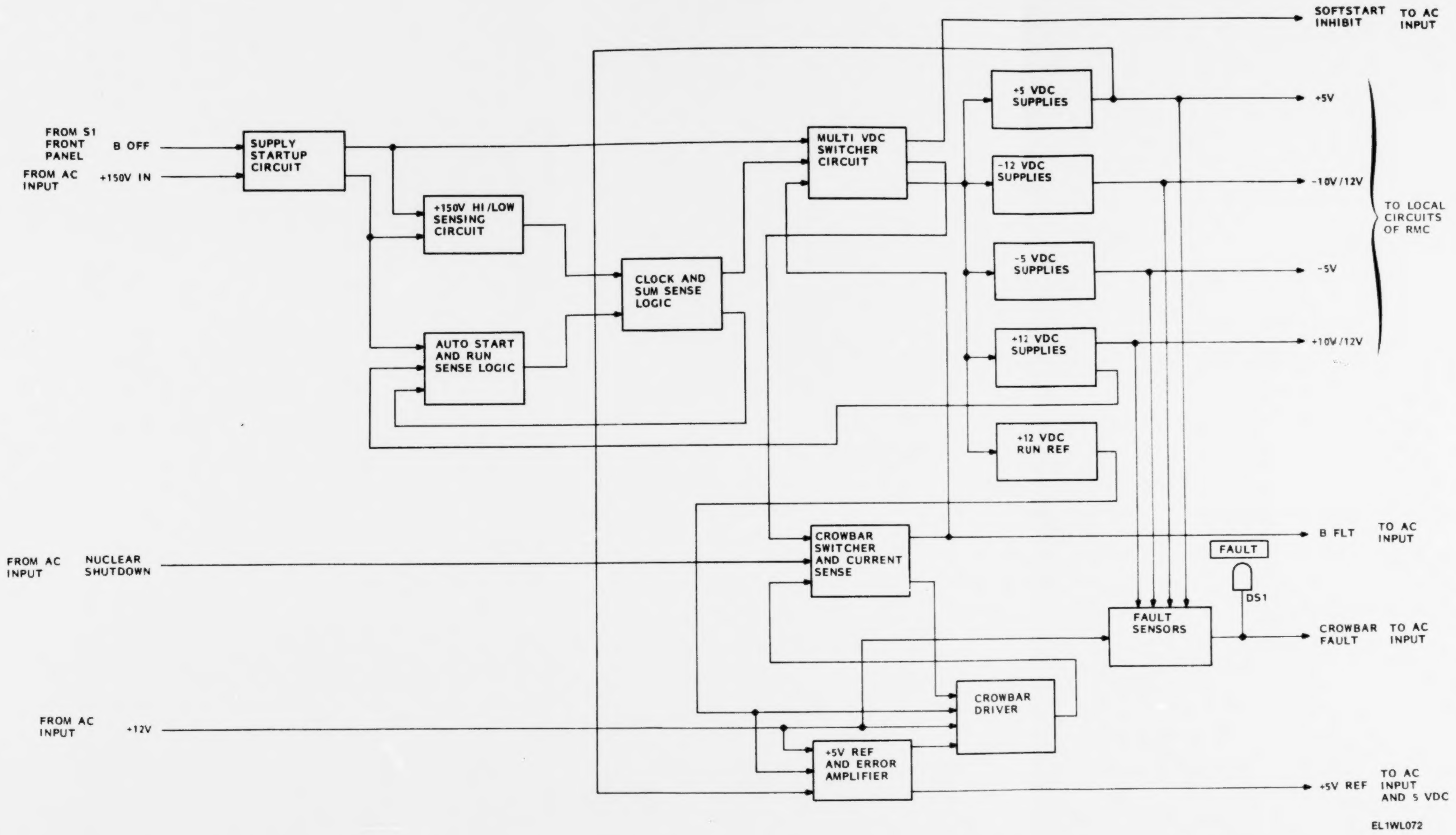

FROM S1 FRONT PANEL
B OFF
FROM AC INPUT
+150V IN
SUPPLY STARTUP CIRCUIT
+150V HI/LOW SENSING CIRCUIT
AUTO START AND RUN SENSE LOGIC
CLOCK AND SUM SENSE LOGIC
MULTI VDC SWITCHER CIRCUIT
SOFTSTART INHIBIT
TO AC INPUT
+5 VDC SUPPLIES
+5V
-12 VDC SUPPLIES
-10V/12V
-5 VDC SUPPLIES
-5V
+12 VDC SUPPLIES
+10V/12V
TO LOCAL CIRCUITS OF RMC
+12 VDC RUN REF
FROM AC INPUT
NUCLEAR SHUTDOWN
CROWBAR SWITCHER AND CURRENT SENSE
B FLT
TO AC INPUT
FAULT
DS1
FAULT SENSORS
CROWBAR FAULT
TO AC INPUT
CROWBAR DRIVER
FROM AC INPUT
+12V
+5V REF AND ERROR AMPLIFIER
+5V REF
TO AC INPUT AND 5 VDC
EL1WL072

Figure FO-10. Power Supply Multi Vdc CCA Block Diagram

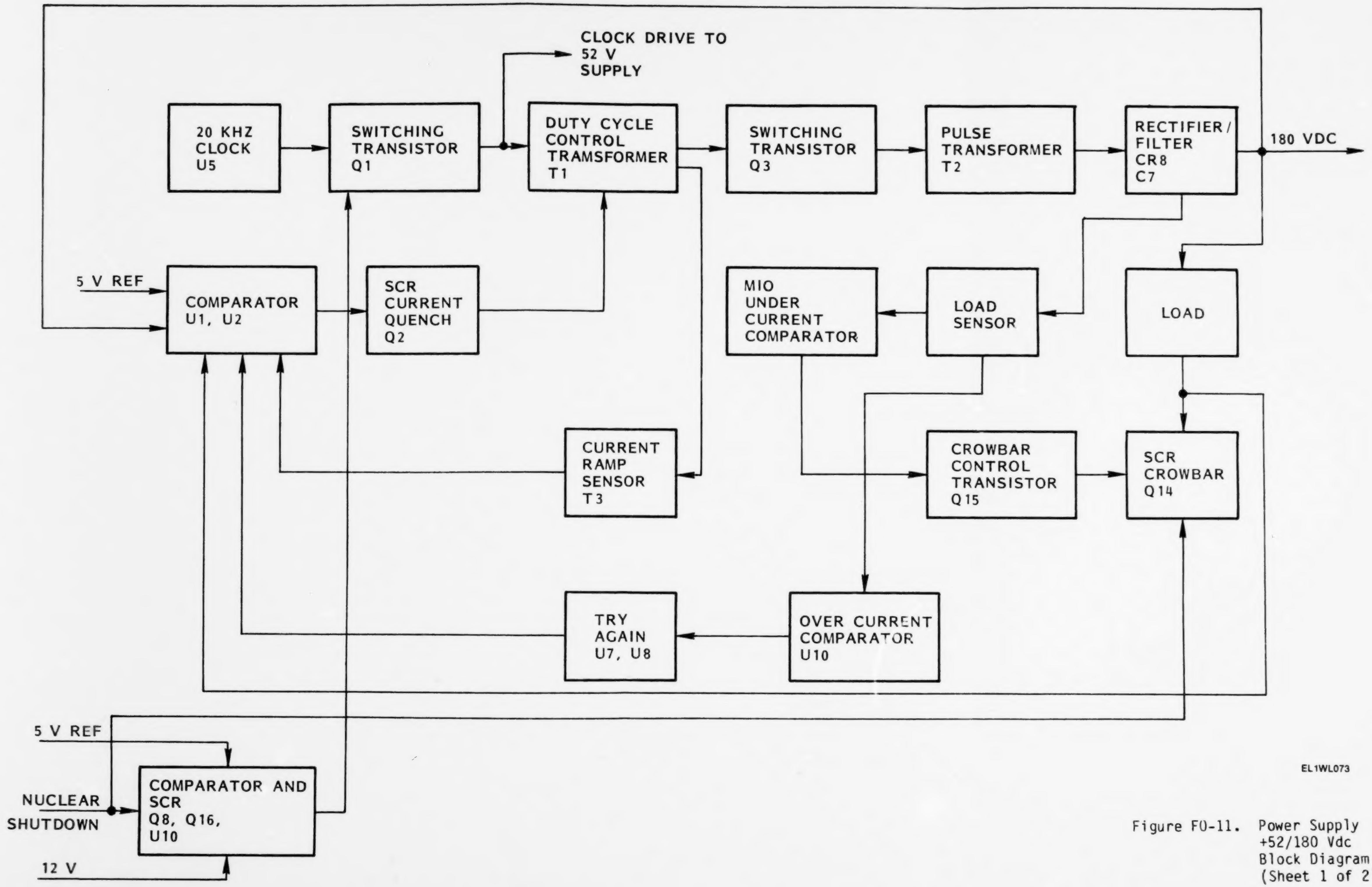

CLOCK DRIVE TO 52 V SUPPLY
20 KHZ CLOCK U5
SWITCHING TRANSISTOR Q1
DUTY CYCLE CONTROL TRAMSFORMER T1
SWITCHING TRANSISTOR Q3
PULSE TRANSFORMER T2
RECTIFIER/ FILTER CR8 C7
180 VDC
5 V REF
COMPARATOR U1, U2
SCR CURRENT QUENCH Q2
MIO UNDER CURRENT COMPARATOR
LOAD SENSOR
LOAD
CURRENT RAMP SENSOR T3
CROWBAR CONTROL TRANSISTOR Q15
SCR CROWBAR Q14
TRY AGAIN U7, U8
OVER CURRENT COMPARATOR U10
5 V REF
NUCLEAR SHUTDOWN
COMPARATOR AND SCR Q8, Q16, U10
12 V
EL1WL073

Figure FO-11. Power Supply +52/180 Vdc Block Diagram (Sheet 1 of 2)

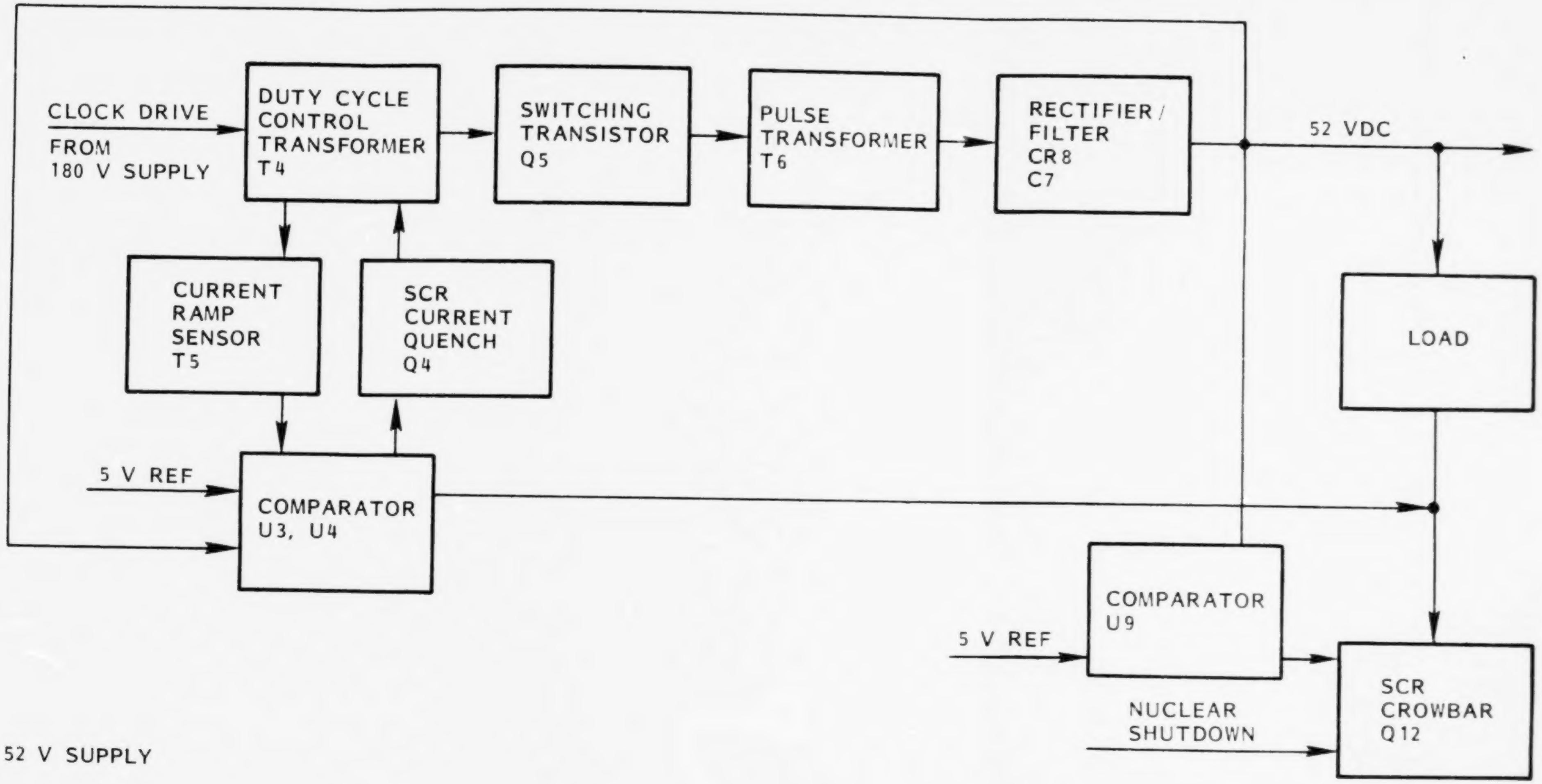

CLOCK DRIVE
FROM
180 V SUPPLY
DUTY CYCLE CONTROL TRANSFORMER T4
SWITCHING TRANSISTOR Q5
PULSE TRANSFORMER T6
RECTIFIER/FILTER CR8 C7
52 VDC
CURRENT RAMP SENSOR T5
SCR CURRENT QUENCH Q4
LOAD
5 V REF
COMPARATOR U3, U4
COMPARATOR U9
5 V REF
NUCLEAR SHUTDOWN
SCR CROWBAR Q12
52 V SUPPLY
EL1WL074

Figure FO-11. Power Supply +52/180 Vdc Block Diagram (Sheet 2 of 2)

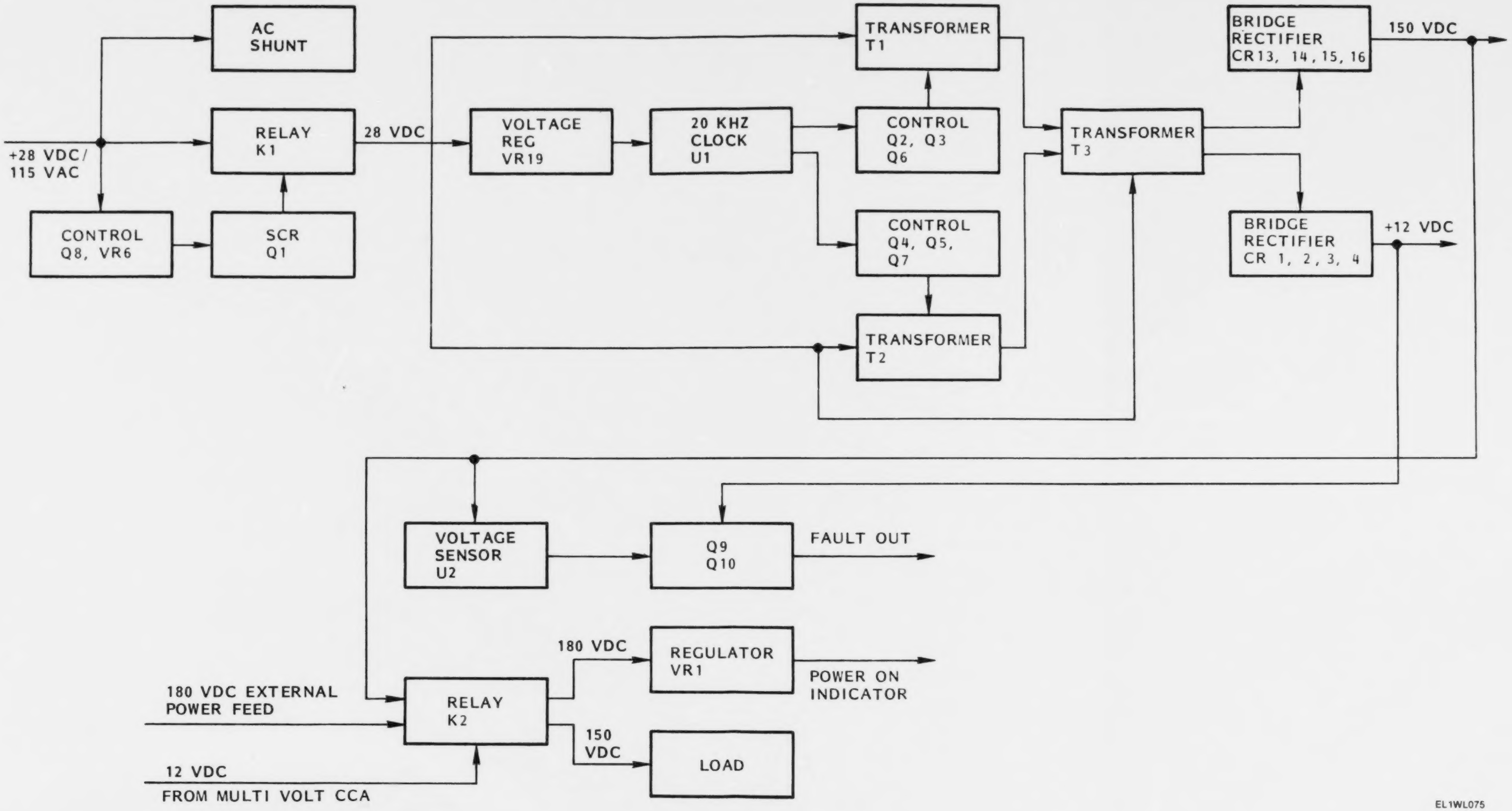

AC SHUNT
RELAY K1
+28 VDC/ 115 VAC
CONTROL Q8, VR6
SCR Q1
28 VDC
VOLTAGE REG VR19
20 KHZ CLOCK U1
TRANSFORMER T1
CONTROL Q2, Q3 Q6
CONTROL Q4, Q5, Q7
TRANSFORMER T2
TRANSFORMER T3
BRIDGE RECTIFIER CR13, 14, 15, 16
150 VDC
BRIDGE RECTIFIER CR 1, 2, 3, 4
+12 VDC
VOLTAGE SENSOR U2
Q9 Q10
FAULT OUT
180 VDC
REGULATOR VR1
POWER ON INDICATOR
180 VDC EXTERNAL POWER FEED
RELAY K2
150 VDC
LOAD
12 VDC
FROM MULTI VOLT CCA
EL1WL075

Figure FO-12. Power Supply Dc Input CCA Block Diagram

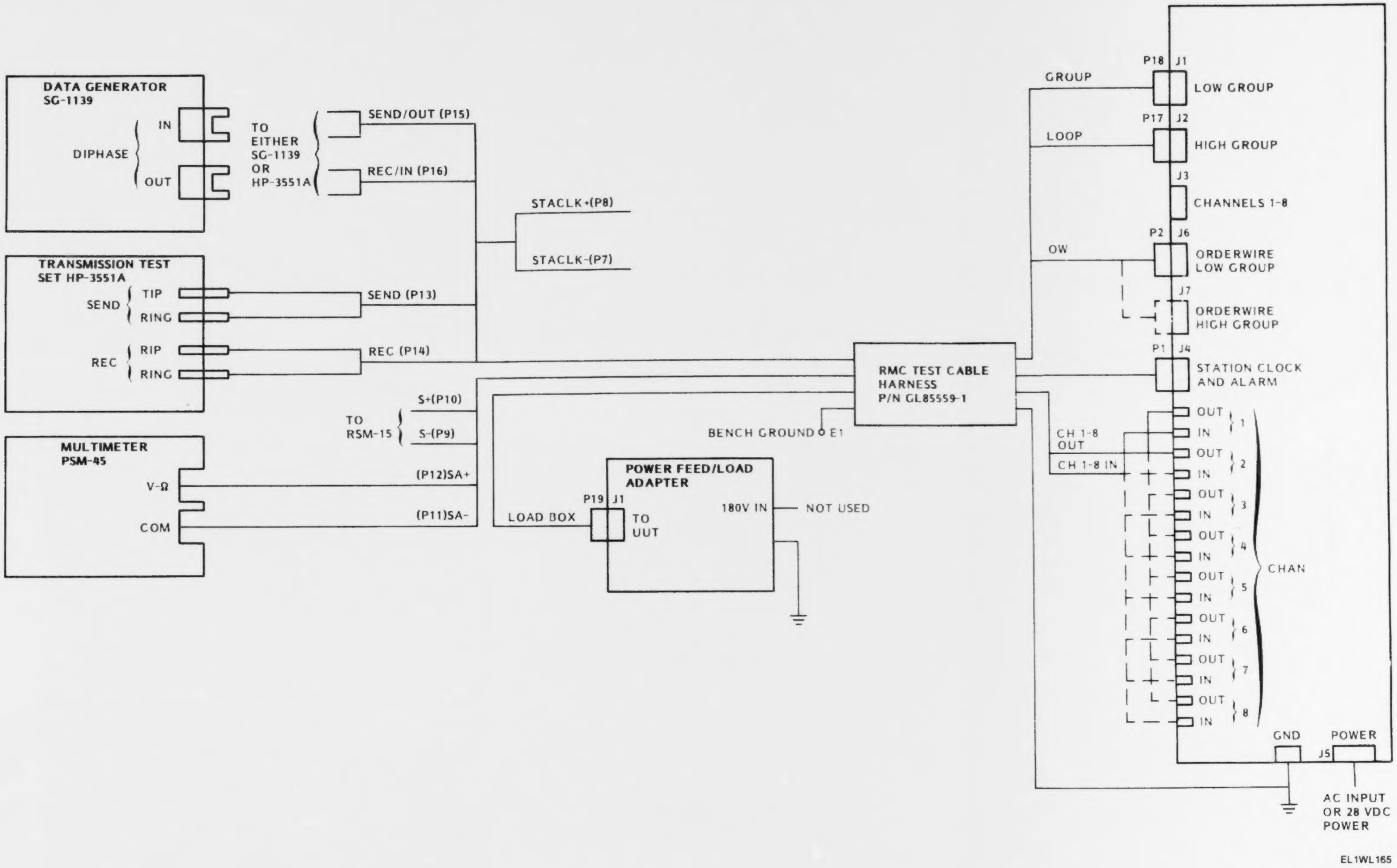

DATA GENERATOR
SG-1139
DIPHASE
IN
OUT
TO EITHER SG-1139 OR HP-3551A
SEND/OUT (P15)
REC/IN (P16)
STACLK+(P8)
STACLK-(P7)
TRANSMISSION TEST SET HP-3551A
SEND
TIP
RING
REC
RIP
RING
SEND (P13)
REC (P14)
TO RSM-15
S+(P10)
S-(P9)
MULTIMETER
PSM-45
V-Ω
COM
(P12)SA+
(P11)SA-
LOAD BOX
P19
J1
POWER FEED/LOAD ADAPTER
TO UUT
180V IN
NOT USED
BENCH GROUND
E1
RMC TEST CABLE HARNESS P/N GL85559-1
GROUP
LOOP
OW
P18
J1
LOW GROUP
P17
J2
HIGH GROUP
J3
CHANNELS 1-8
P2
J6
ORDERWIRE LOW GROUP
J7
ORDERWIRE HIGH GROUP
P1
J4
STATION CLOCK AND ALARM
CH 1-8 OUT
CH 1-8 IN
OUT
IN
1
2
3
4
5
6
7
8
CHAN
GND
POWER
J5
AC INPUT OR 28 VDC POWER
EL1WL165

Figure FO-12A. RMC Test Setup Diagram

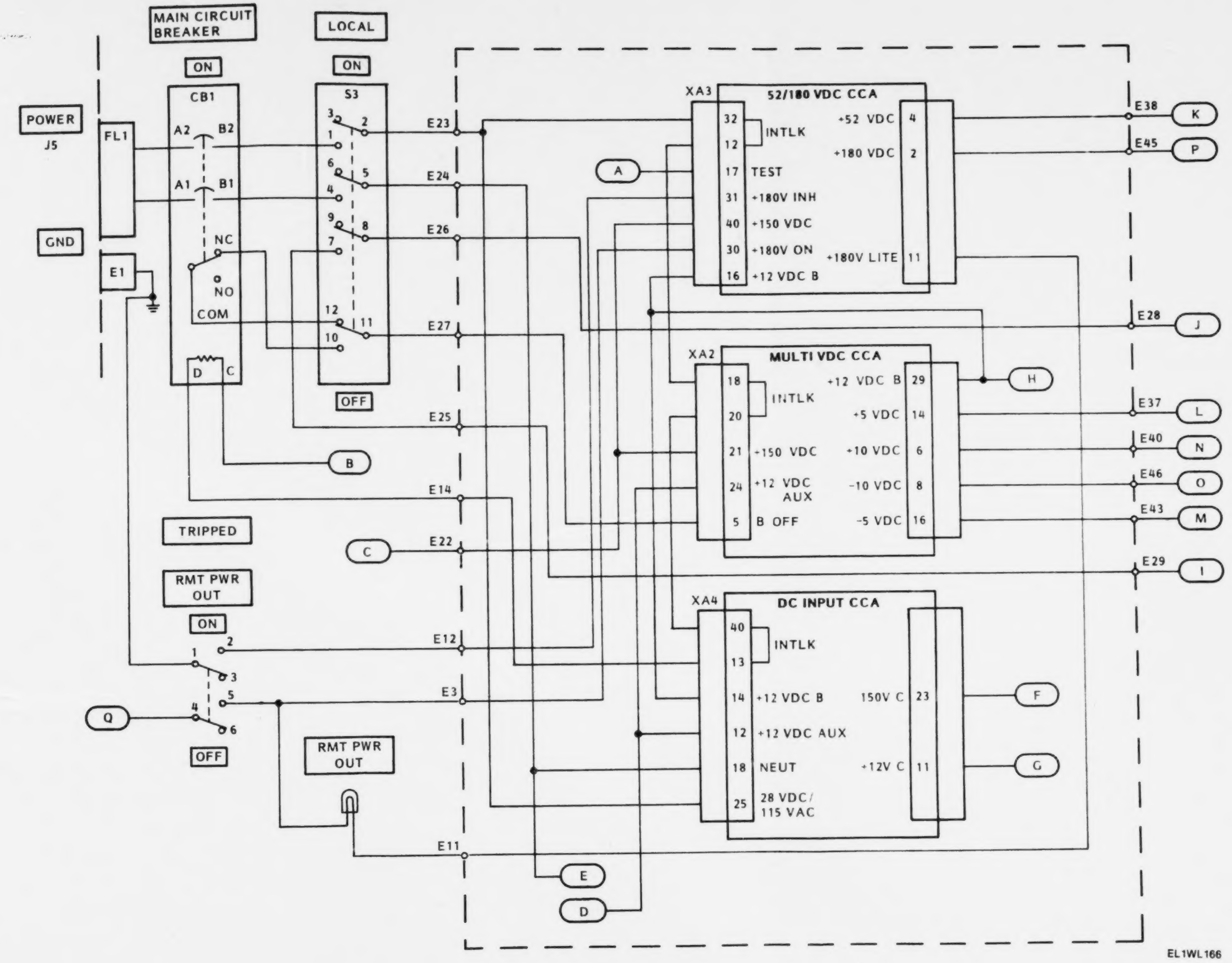
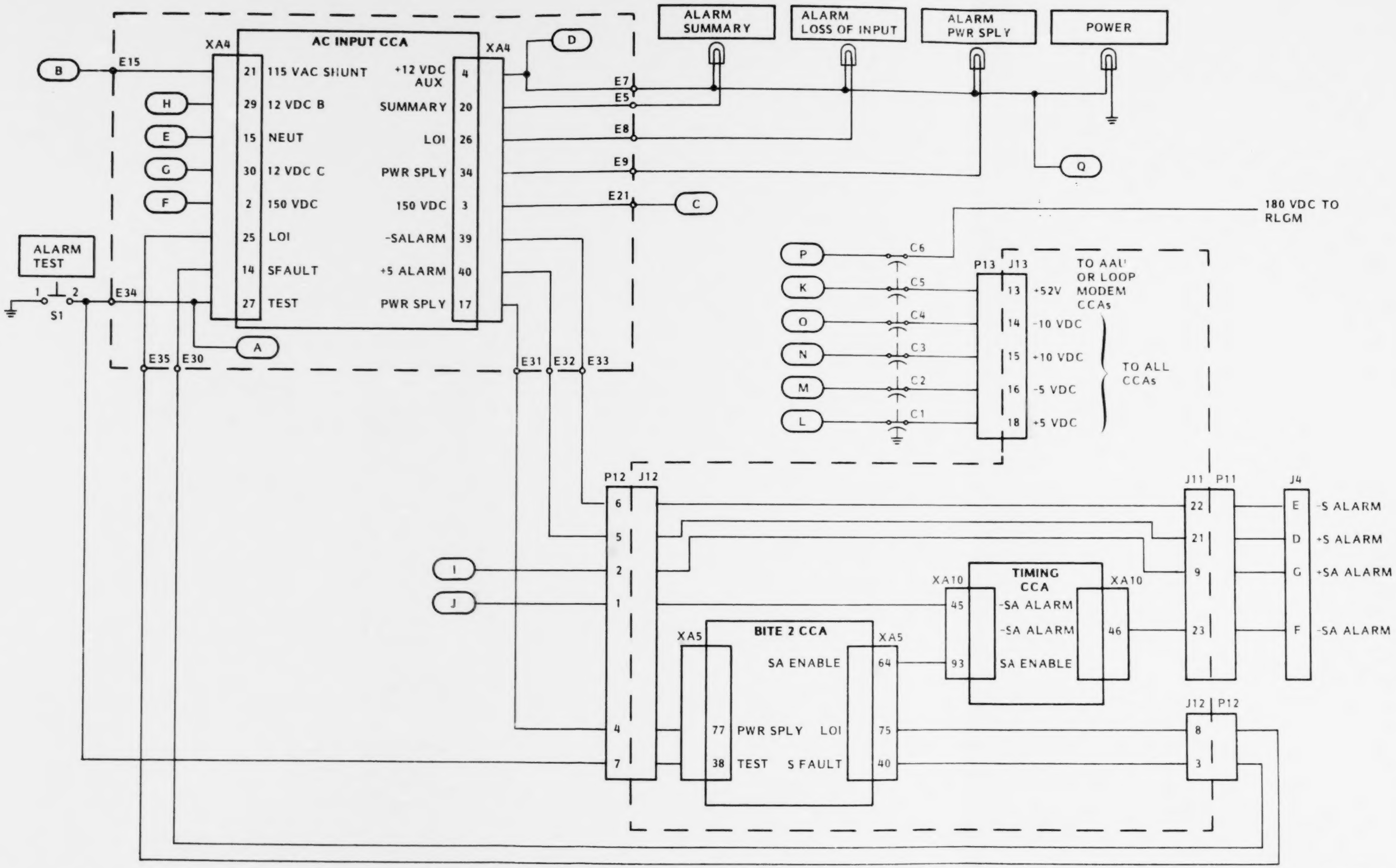

MAIN CIRCUIT BREAKER
LOCAL
ON
ON
POWER
J5
GND
FL1
E1
CB1
A2
B2
A1
B1
NC
NO
COM
D
C
S3
OFF
E23
E24
E26
E27
E25
E14
E22
E12
E3
E11
TRIPPED
RMT PWR OUT
ON
OFF
RMT PWR OUT
XA3
52/180 VDC CCA
32
12
INTLK
17 TEST
31 +180V INH
40 +150 VDC
30 +180V ON
16 +12 VDC B
+52 VDC 4
+180 VDC 2
+180V LITE 11
XA2
MULTI VDC CCA
18
20
INTLK
21 +150 VDC
24 +12 VDC AUX
5 B OFF
+12 VDC B 29
+5 VDC 14
+10 VDC 6
-10 VDC 8
-5 VDC 16
XA4
DC INPUT CCA
40
13
INTLK
14 +12 VDC B
12 +12 VDC AUX
18 NEUT
25 28 VDC/115 VAC
150V C 23
+12V C 11
E38
E45
E28
E37
E40
E46
E43
E29
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
EL1WL166

Figure FO-12B. Controls and Indicators Functional Block Diagram (Sheet 1 of 2)



ALARM SUMMARY
ALARM LOSS OF INPUT
ALARM PWR SPLY
POWER
AC INPUT CCA
XA4
XA4
D
B
E15
21 115 VAC SHUNT
+12 VDC AUX 4
H
29 12 VDC B
SUMMARY 20
E
15 NEUT
LOI 26
G
30 12 VDC C
PWR SPLY 34
F
2 150 VDC
150 VDC 3
25 LOI
-SALARM 39
14 SFAULT
+5 ALARM 40
27 TEST
PWR SPLY 17
E7
E5
E8
E9
E21
C
Q
ALARM TEST
1
2
S1
E34
A
E35
E30
E31
E32
E33
180 VDC TO RLGM
P
K
O
N
M
L
C6
C5
C4
C3
C2
C1
P13
J13
13 +52V
14 -10 VDC
15 +10 VDC
16 -5 VDC
18 +5 VDC
TO AAU OR LOOP MODEM CCAs
TO ALL CCAs
P12
J12
6
5
2
1
4
7
I
J
TIMING CCA
XA10
XA10
45 -SA ALARM
-SA ALARM 46
93 SA ENABLE
BITE 2 CCA
XA5
XA5
SA ENABLE 64
77 PWR SPLY
LOI 75
38 TEST
S FAULT 40
J11
P11
22
21
9
23
J4
E -S ALARM
D +S ALARM
G +SA ALARM
F -SA ALARM
J12
P12
8
3
EL1WL167

Figure FO-12B. Controls and Indicators Functional Block Diagram (Sheet 2 of 2)

SCHEMATIC DIAGRAMS

Schematic diagrams contain zone identifiers (three letters and five numbers) and signal continuation symbols which enable the user to follow signals on a single sheet or between sheets of a multi-sheet schematic.

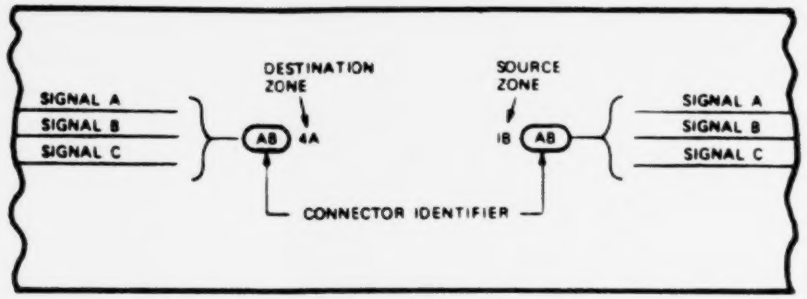
ZONE IDENTIFIERS

Each sheet of a schematic is divided into five vertical zones (numbered) and three horizontal zones (lettered). This allows the schematic to be divided into 15 zones with each zone referenced by a number/letter combination. This permits easy circuit component location for reference purposes. The three horizontal zones on each sheet are lettered A, B, and C while the five vertical zones are numbered as follows:

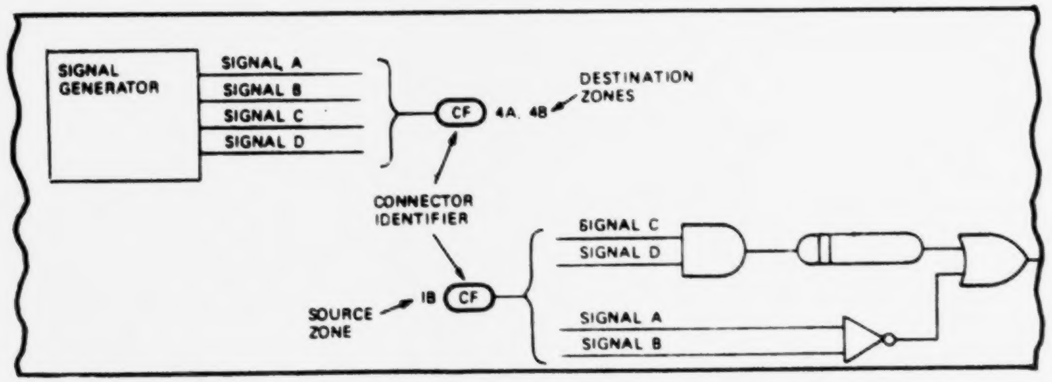
Sheet 1 - zones 1 through 5
Sheet 2 - zones 11 through 15
Sheet 3 - zones 21 through 25
Sheet 4 - zones 31 through 35
etc.

OVAL CONNECTORS

Oval connectors are used to continue signals from one area of a sheet to another area of a sheet.

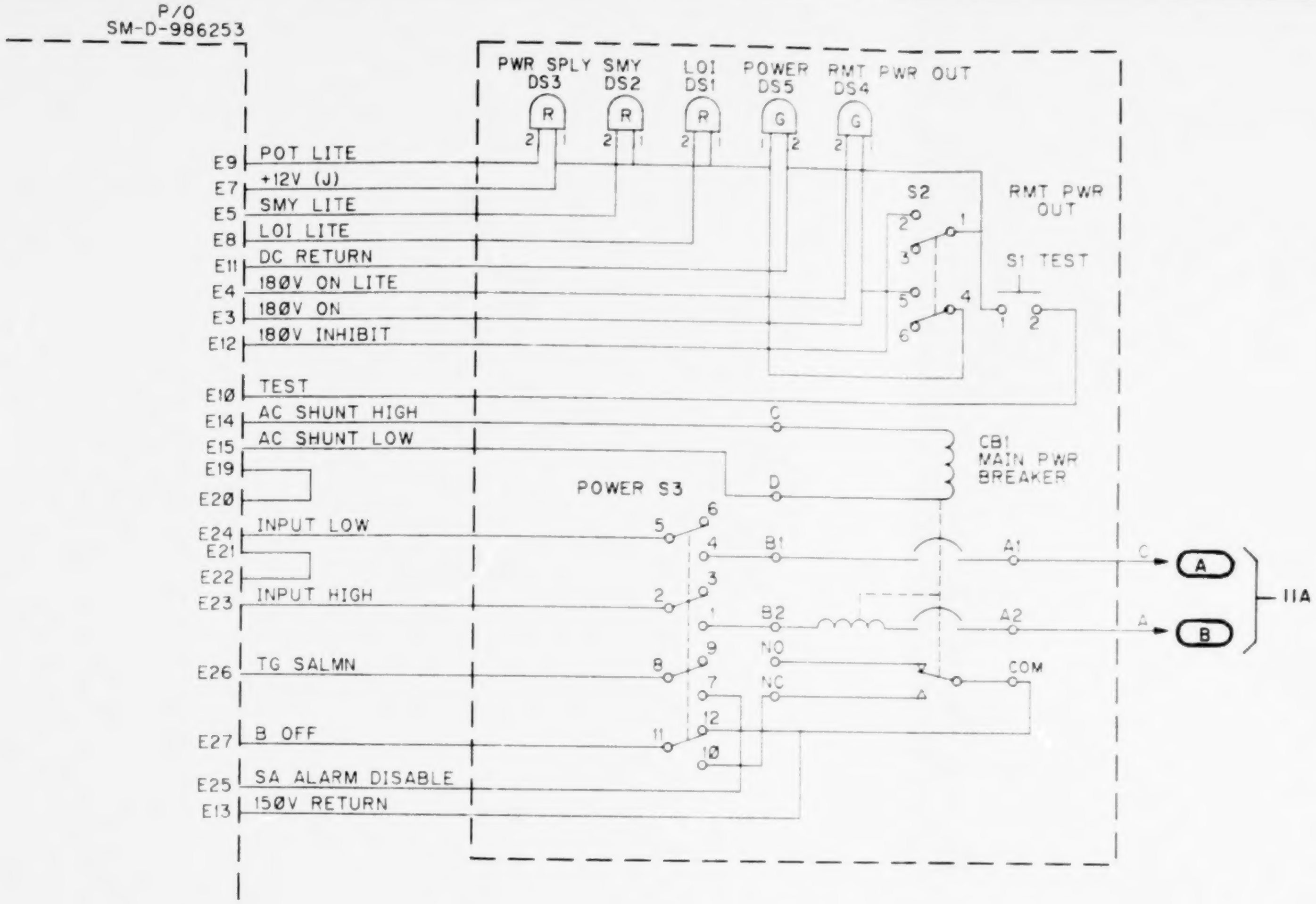

SIGNAL A
SIGNAL B
SIGNAL C
DESTINATION ZONE
AB
4A
SOURCE ZONE
1B
AB
SIGNAL A
SIGNAL B
SIGNAL C
CONNECTOR IDENTIFIER

Oval Connectors Used to Continue Signals EL1WL076


SIGNAL GENERATOR
SIGNAL A
SIGNAL B
SIGNAL C
SIGNAL D
CF
4A, 4B
DESTINATION ZONES
CONNECTOR IDENTIFIER
SOURCE ZONE
1B
CF
SIGNAL C
SIGNAL D
SIGNAL A
SIGNAL B

Oval Connectors Used to Continue Signals to More Than One Destination EL1WL077

Figure FO-13. Schematic Diagram Zone Identifiers and Connectors


1
2
3
4
5
A
B
C
P/O
SM-D-986253
PWR SPLY DS3
SMY DS2
LOI DS1
POWER DS5
RMT PWR OUT DS4
R
R
R
G
G
E9 POT LITE
E7 +12V (J)
E5 SMY LITE
E8 LOI LITE
E11 DC RETURN
E4 180V ON LITE
E3 180V ON
E12 180V INHIBIT
E10 TEST
E14 AC SHUNT HIGH
E15 AC SHUNT LOW
E19
E20
E24 INPUT LOW
E21
E22
E23 INPUT HIGH
E26 TG SALMN
E27 B OFF
E25 SA ALARM DISABLE
E13 150V RETURN
S2
RMT PWR OUT
S1 TEST
C
D
CB1 MAIN PWR BREAKER
POWER S3
B1
B2
A1
A2
NO
NC
COM
A
B
11A

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. UNLESS OTHERWISE SPECIFIED: ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. THIS DIAGRAM CONFORMS TO ANSI Y32.2-1975 GRAPHIC SYMBOLS FOR ELECTRICAL AND ELECTRONIC DIAGRAMS.
4. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.

HIGHEST REFERENCE DESIGNATIONS		
CB1	C14	DS5
FL1	J7	L2
P13	S3	

REFERENCE DESIGNATIONS NOT USED		
P1 THRU P7		

REV A

EL1WL078

Figure FO-14. Multiplexer TD-1234(P)/TTC Interconnection Diagram (Sheet 1 of 3)

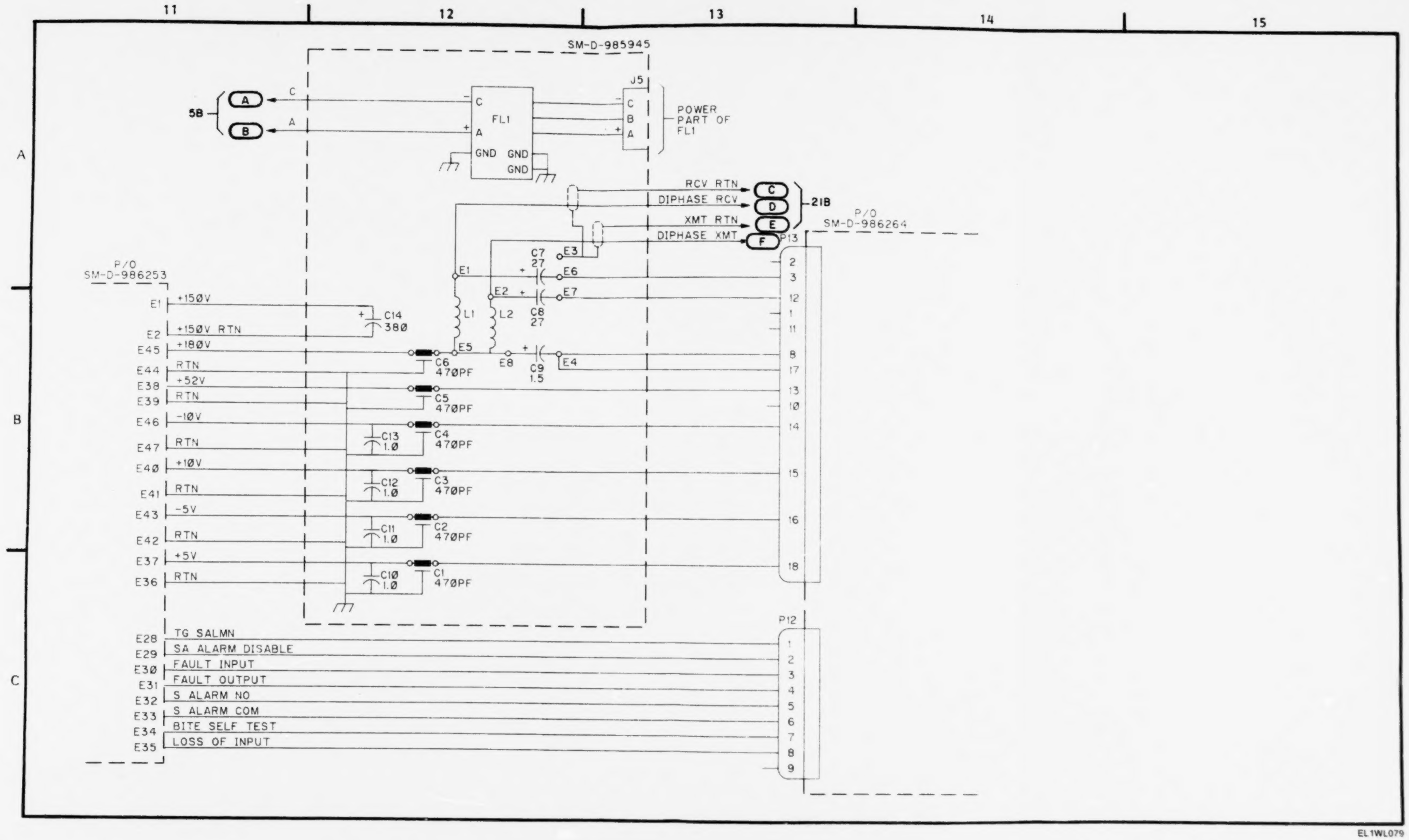
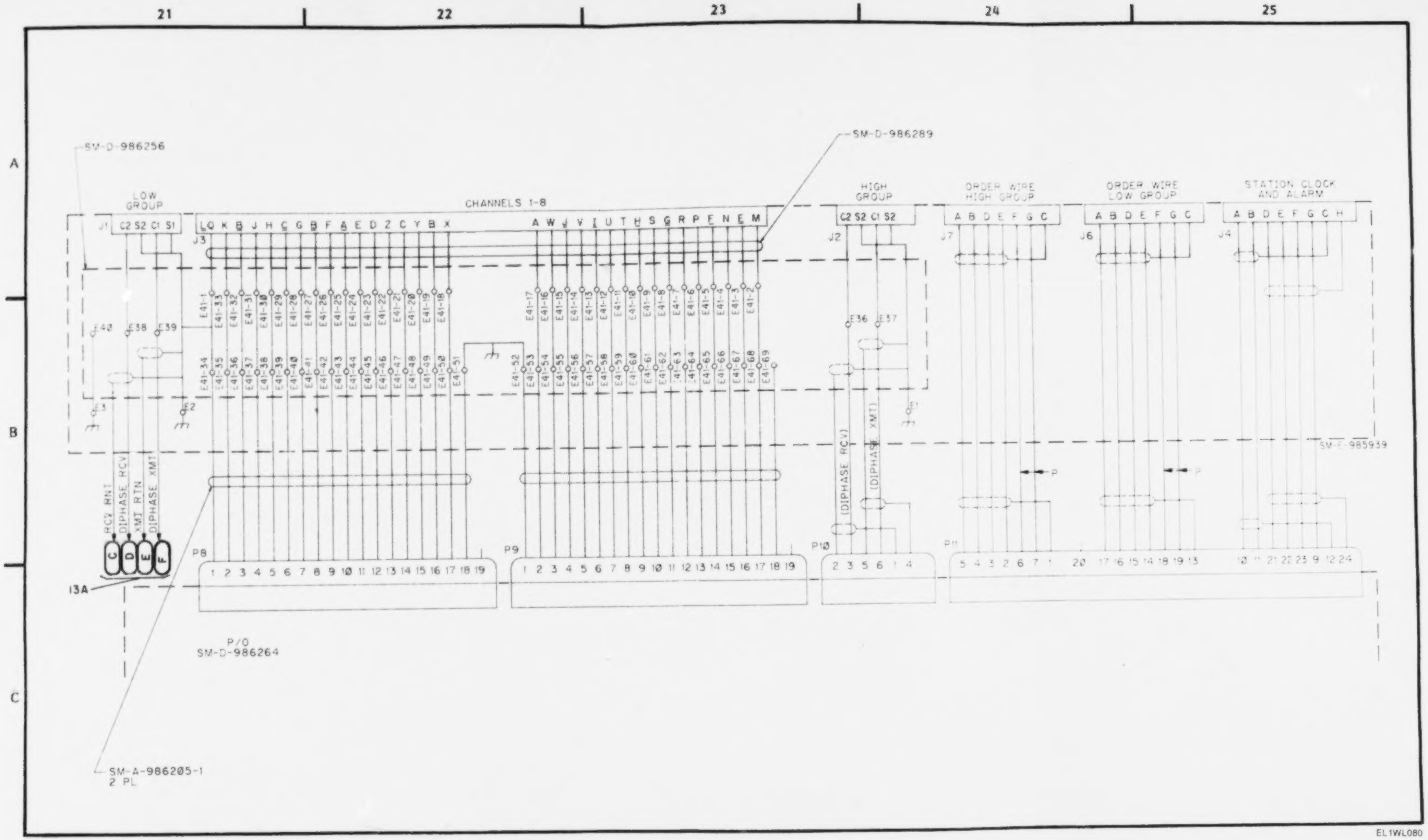
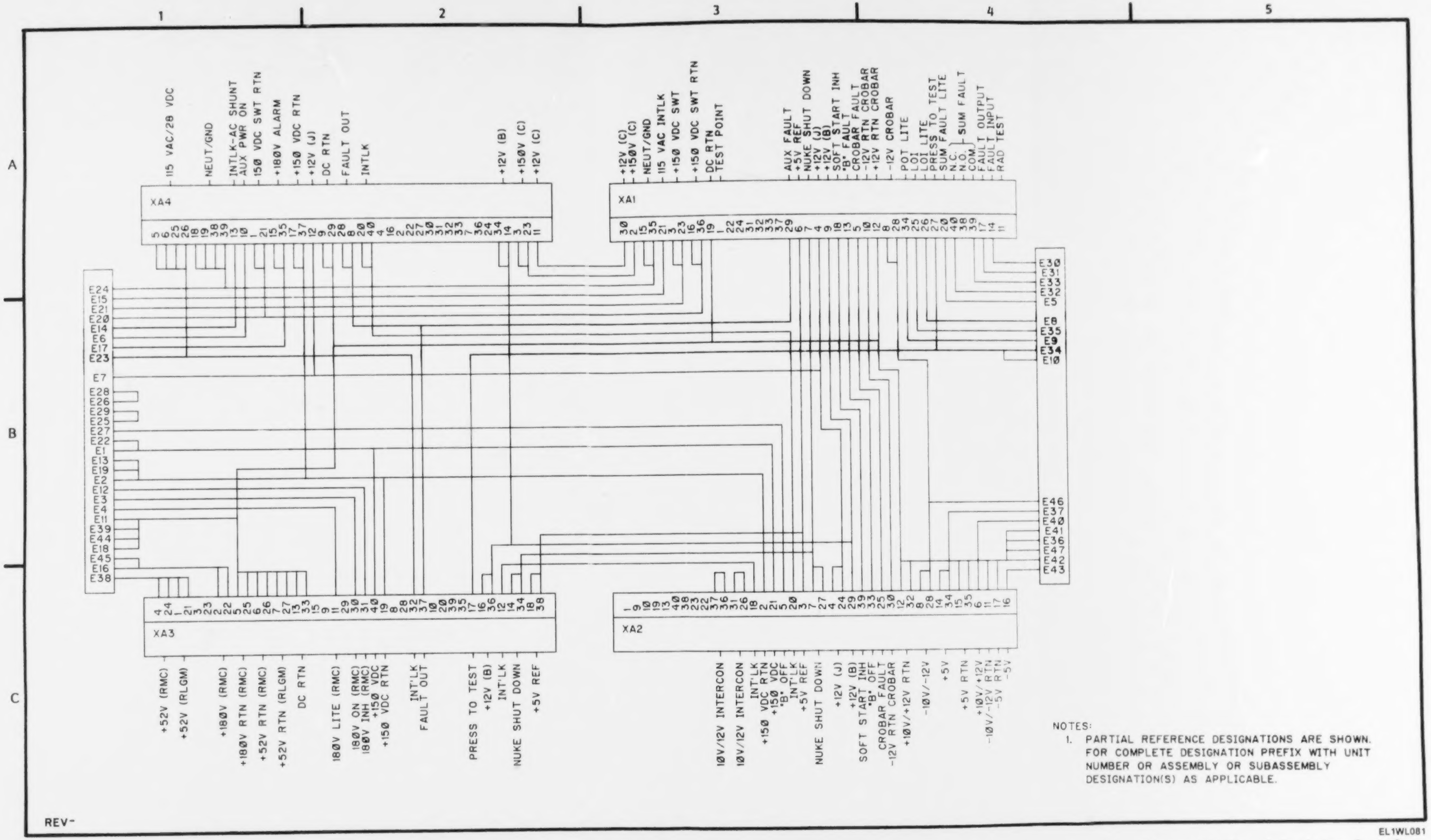

11
12
13
14
15
A
B
C
SM-D-985945
5B
A
B
C
A
FL1
C
A
GND
GND
GND
J5
C
B
A
POWER
PART OF
FL1
RCV RTN
DIPHASE RCV
XMT RTN
DIPHASE XMT
C
D
E
F
21B
P/O
SM-D-986264
P13
C7
27
E3
E6
E1
E2
E7
C8
27
L1
L2
E5
E8
C9
1.5
E4
P/O
SM-D-986253
E1 +15ØV
E2 +15ØV RTN
C14
38Ø
E45 +18ØV
E44 RTN
C6
47ØPF
E38 +52V
E39 RTN
C5
47ØPF
E46 -1ØV
E47 RTN
C13
1.Ø
C4
47ØPF
E4Ø +1ØV
E41 RTN
C12
1.Ø
C3
47ØPF
E43 -5V
E42 RTN
C11
1.Ø
C2
47ØPF
E37 +5V
E36 RTN
C1Ø
1.Ø
C1
47ØPF
2
3
12
1
11
8
17
13
1Ø
14
15
16
18
P12
E28 TG SALMN
E29 SA ALARM DISABLE
E3Ø FAULT INPUT
E31 FAULT OUTPUT
E32 S ALARM NO
E33 S ALARM COM
E34 BITE SELF TEST
E35 LOSS OF INPUT
1
2
3
4
5
6
7
8
9
EL1WL079

Figure FO-14. Multiplexer TD-1234(P)/TTC Interconnection Diagram (Sheet 2 of 3)


21
22
23
24
25
A
B
C
SM-D-986256
SM-D-986289
LOW GROUP
CHANNELS 1-8
HIGH GROUP
ORDER WIRE HIGH GROUP
ORDER WIRE LOW GROUP
STATION CLOCK AND ALARM
J1
C2 S2 C1 S1
J3
LQ K B J H C G B F A E D Z C Y B X
A W J V I U T H S G R P F N E M
J2
C2 S2 C1 S2
J7
A B D E F G C
J6
A B D E F G C
J4
A B D E F G C H
E40
E38
E39
E36
E37
E3
E2
E1
SM-C-985939
RCV RNT
DIPHASE RCV
XMT RTN
DIPHASE XMT
(DIPHASE RCV)
(DIPHASE XMT)
C
D
E
F
13A
P8
P9
P10
P11
P
P/O SM-D-986264
SM-A-986205-1 2 PL

EL1WL080

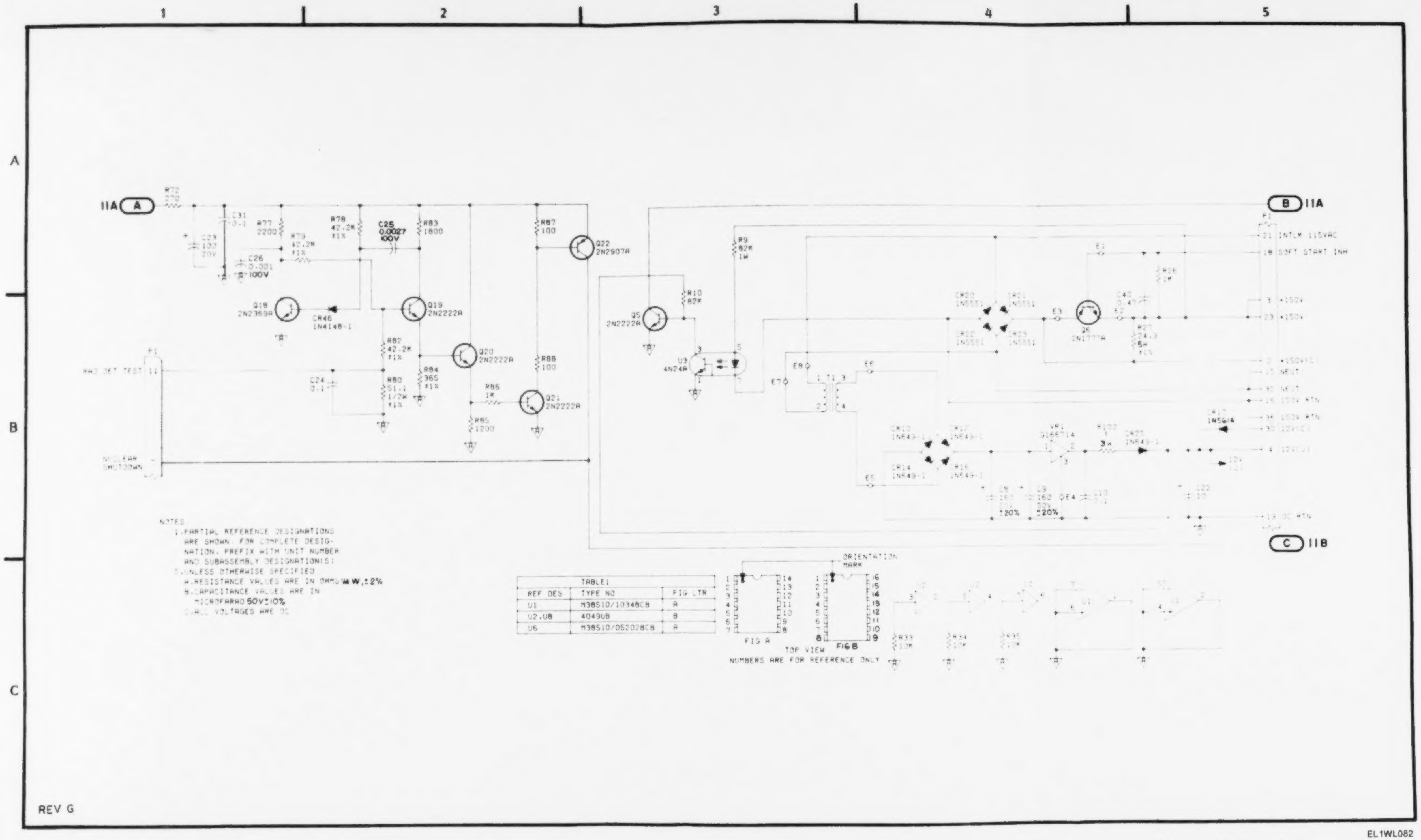
Figure FO-14. Multiplexer TD-1234(P)/TTC Interconnection Diagram (Sheet 3 of 3)


1
2
3
4
5
A
B
C
XA4
XA1
XA3
XA2
115 VAC/28 VDC
NEUT/GND
INTLK-AC SHUNT
AUX PWR ON
150 VDC SWT RTN
+180V ALARM
+150 VDC RTN
+12V (J)
DC RTN
FAULT OUT
INTLK
+12V (B)
+150V (C)
+12V (C)
+12V (C)
+150V (C)
NEUT/GND
115 VAC INTLK
+150 VDC SWT
+150 VDC SWT RTN
DC RTN
TEST POINT
AUX FAULT
+5V REF
NUKE SHUT DOWN
+12V (J)
+12V (B)
SOFT START INH
"B" FAULT
CROBAR FAULT
-12V RTN CROBAR
+12V RTN CROBAR
-12V CROBAR
POT LITE
LOI
LOI LITE
PRESS TO TEST
SUM FAULT LITE
N.C.
N.O.
SUM FAULT
COM
FAULT OUTPUT
FAULT INPUT
RAD TEST
E24
E15
E21
E20
E14
E6
E17
E23
E7
E28
E26
E29
E25
E27
E22
E1
E13
E19
E2
E12
E3
E4
E11
E39
E44
E18
E45
E16
E38
E30
E31
E33
E32
E5
E8
E35
E9
E34
E10
E46
E37
E40
E41
E36
E47
E42
E43
+52V (RMC)
+52V (RLGM)
+180V (RMC)
+180V RTN (RMC)
+52V RTN (RMC)
+52V RTN (RLGM)
DC RTN
180V LITE (RMC)
180V ON (RMC)
180V INH (RMC)
+150 VDC
+150 VDC RTN
INT'LK
FAULT OUT
PRESS TO TEST
+12V (B)
INT'LK
NUKE SHUT DOWN
+5V REF
10V/12V INTERCON
10V/12V INTERCON
INT'LK
+150 VDC RTN
+150 VDC
"B" OFF
INT'LK
+5V REF
NUKE SHUT DOWN
+12V (J)
+12V (B)
SOFT START INH
"B" OFF
CROBAR FAULT
-12V RTN CROBAR
+10V/+12V RTN
-10V/-12V
+5V
+5V RTN
+10V/+12V
-10V/-12V RTN
-5V RTN
-5V
REV-
EL1WL081

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.

Figure FO-15. 4-Position Backplane Schematic Diagram


1
2
3
4
5
A
B
C
11A A
R72 270
C31 0.1
C23 100 20V
C26 0.001 100V
R77 2200
R79 42.2K ±1%
R78 42.2K ±1%
C25 0.0027 100V
R83 1800
R87 100
Q22 2N2907A
Q18 2N2369A
CR46 1N4148-1
Q19 2N2222A
R82 42.2K ±1%
Q20 2N2222A
C24 0.1
R80 51.1 1/2W ±1%
R84 365 ±1%
R86 1K
R85 1200
R88 100
Q21 2N2222A
P1
RAD DET TEST 11
NUCLEAR SHUTDOWN
Q5 2N2222A
R10 82K
R9 82K 1W
U3 4N24A
E8
E6
E7
T1
E5
CR20 1N5551
CR21 1N5551
CR22 1N5551
CR23 1N5551
E3
Q6 2N1777A
E1
E2
C40 0.47
R26 1K
R27 24.3 5W ±1%
CR13 1N649-1
CR12 1N649-1
CR14 1N649-1
CR16 1N649-1
VR1 D166714
R100 3W
CR25 1N649-1
CR17 1N5614
C8 150 ±20%
C9 150 50V ±20%
E4
C10 0.1
C22 10
B 11A
21 INTLK 115VAC
18 SOFT START INH
3 +150V
23 +150V
2 +150V(C)
10 NEUT
35 NEUT
15 150V RTN
36 150V RTN
30 12V(C)
4 12V(J)
12V
19 DC RTN
C 11B
ORIENTATION MARK
FIG A
FIG B
TOP VIEW
NUMBERS ARE FOR REFERENCE ONLY
R33 10K
R34 10K
R35 10K
REV G

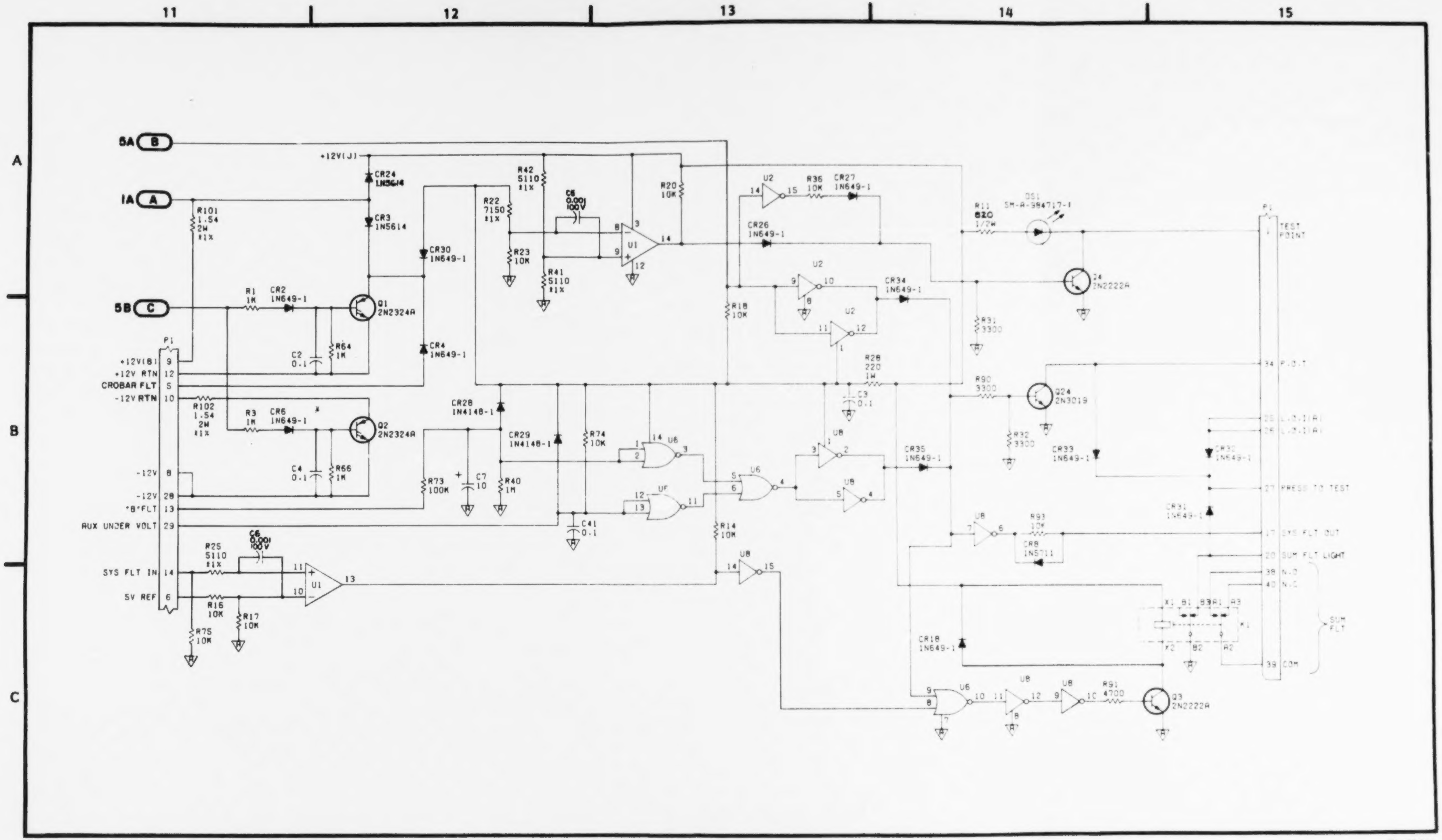
NOTES
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S)
2. UNLESS OTHERWISE SPECIFIED
A. RESISTANCE VALUES ARE IN OHMS ¼ W, ±2%
B. CAPACITANCE VALUES ARE IN MICROFARAD 50V±10%
3. ALL VOLTAGES ARE DC

TABLE1

REF DES	TYPE NO	FIG LTR
U1	M38510/10348CB	A
U2, U8	4049UB	B
U6	M38510/05202BCB	A

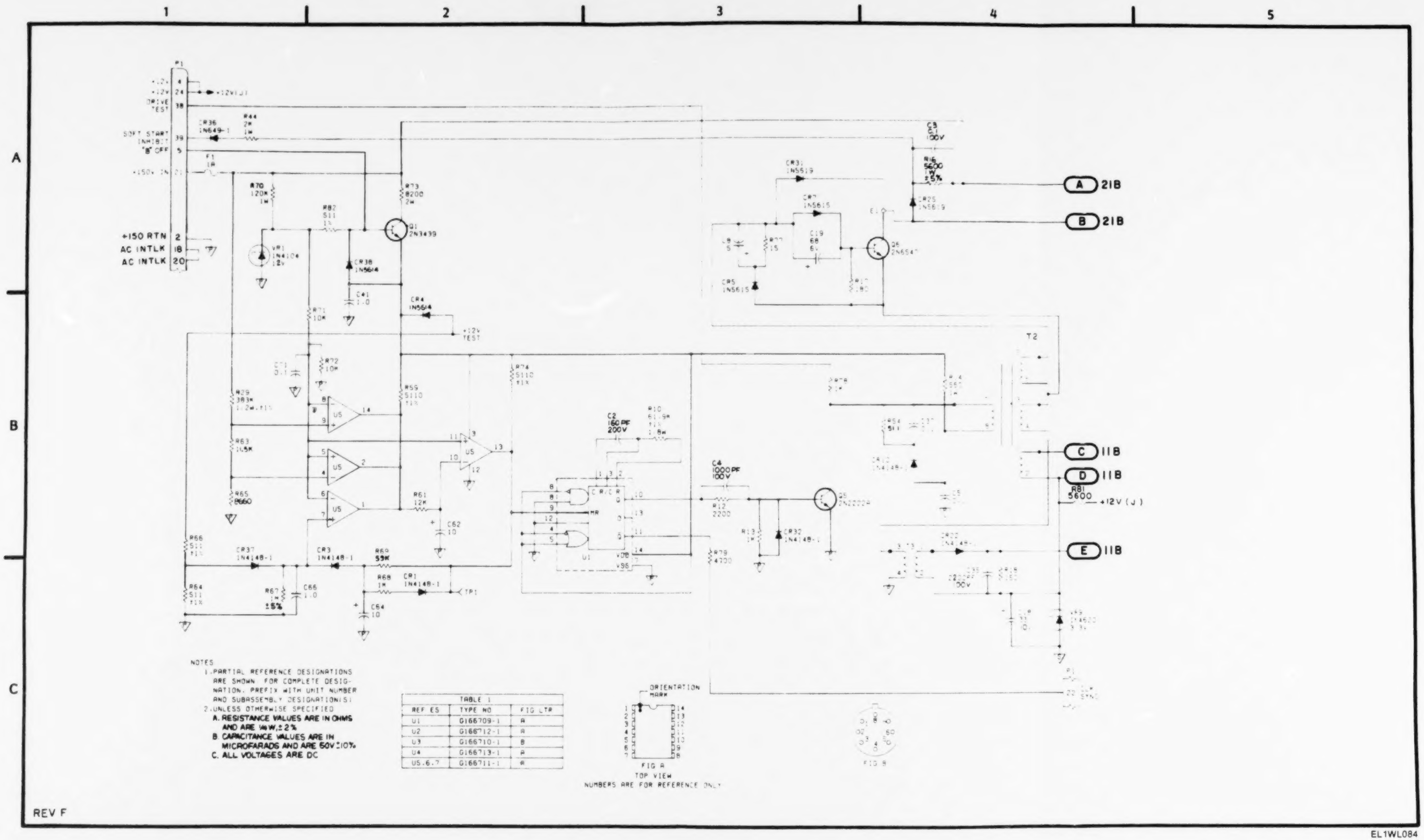
EL1WL082

Figure FO-16. Ac Input CCA A1 Schematic Diagram (Sheet 1 of 2)


11
12
13
14
15
A
B
C
5A B
1A A
5B C
+12V(J)
CR24 1N5614
CR3 1N5614
R101 1.54 2W ±1%
R1 1K
CR2 1N649-1
Q1 2N2324A
C2 0.1
R64 1K
CR30 1N649-1
CR4 1N649-1
R42 5110 ±1%
R22 7150 ±1%
R23 10K
R41 5110 ±1%
C5 0.001 100V
U1
R20 10K
U2
R36 10K
CR27 1N649-1
CR26 1N649-1
CR34 1N649-1
R18 10K
R28 220 1W
C3 0.1
R11 820 1/2W
DS1 SM-A-984717-1
Q4 2N2222A
R31 3300
P1
+12V(B) 9
+12V RTN 12
CROBAR FLT 5
-12V RTN 10
-12V 8
-12V 28
"B" FLT 13
AUX UNDER VOLT 29
SYS FLT IN 14
5V REF 6
R102 1.54 2W ±1%
R3 1K
CR6 1N649-1
Q2 2N2324A
C4 0.1
R66 1K
CR28 1N4148-1
CR29 1N4148-1
R74 10K
R73 100K
C7 10
R40 1M
C41 0.1
U6
U8
CR35 1N649-1
R14 10K
R25 5110 ±1%
C6 0.001 100V
R16 10K
R17 10K
R75 10K
R90 3300
Q24 2N3019
R32 3300
CR33 1N649-1
CR32 1N649-1
CR31 1N649-1
R93 10K
CR8 1N5711
CR18 1N649-1
K1
X1 B1 B3 A1 A3
X2 B2 A2
R91 4700
Q3 2N2222A
1 TEST POINT
34 P.O.T
25 L.O.I(A)
26 L.O.I(A)
27 PRESS TO TEST
17 SYS FLT OUT
20 SUM FLT LIGHT
38 N.O
40 N.C
39 COM
SUM FLT

EL1WL083

Figure FO-16. Ac Input CCA A1 Schematic Diagram (Sheet 2 of 2)

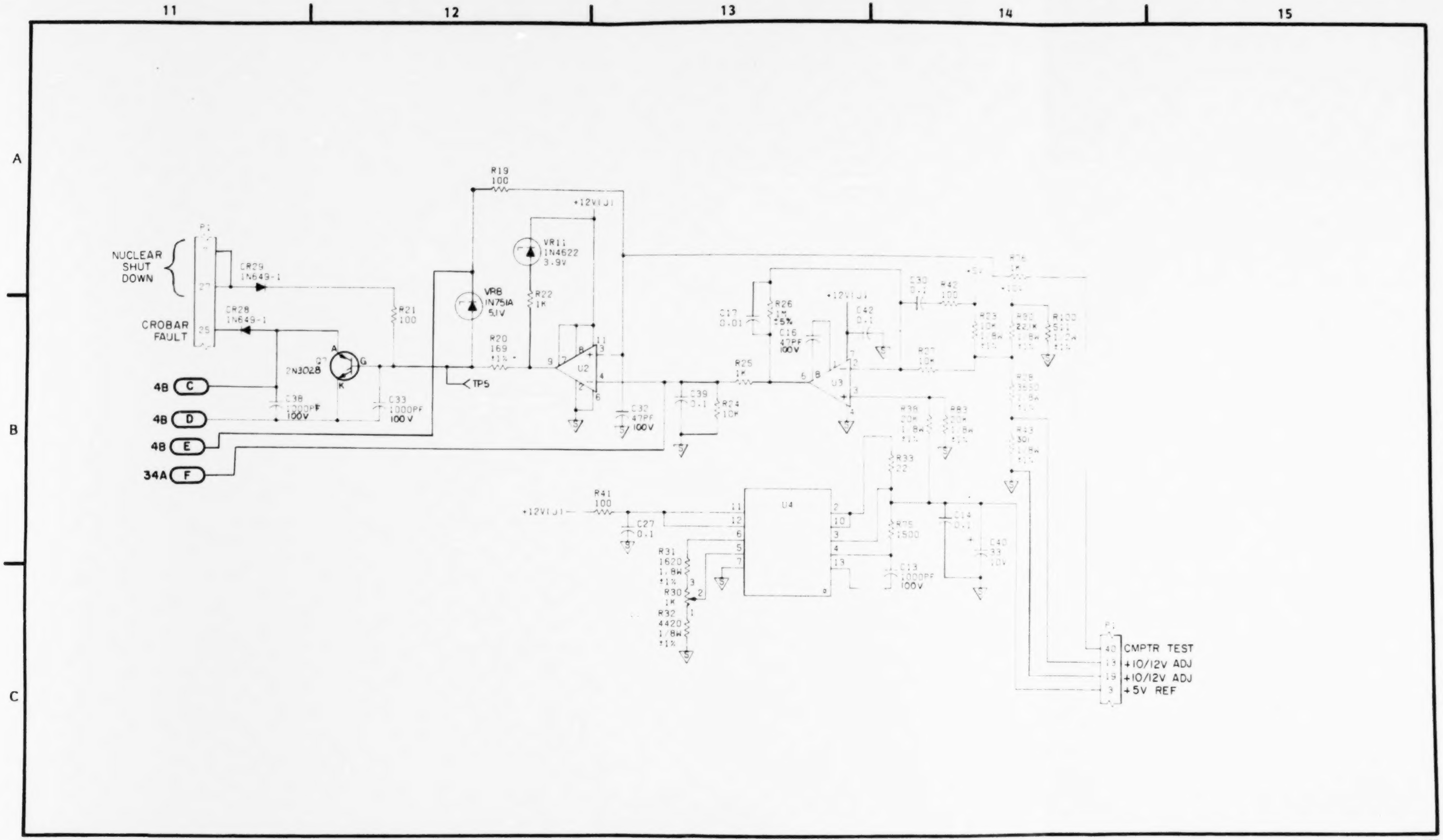

1
2
3
4
5
A
B
C
P1
+12V
+12V
DRIVE TEST
SOFT START INHIBIT
"B" OFF
+150V IN
+150 RTN
AC INTLK
AC INTLK
4
24
38
39
5
21
2
18
20
+12V(J)
CR36 1N649-1
R44 2K 1W
F1 1A
R70 120K 1W
VR1 1N4104 12V
R82 511 1%
CR38 1N5614
R73 8200 2W
Q1 2N3439
C41 1.0
CR4 1N5614
+12V TEST
R71 10K
C71 0.1
R72 10K
R29 383K 1/2W,±1%
R63 105K
R65 8660
U5
R55 5110 ±1%
R74 5110 ±1%
R61 12K
C62 10
R66 511 ±1%
R64 511 ±1%
CR37 1N4148-1
R67 1K ±5%
C66 1.0
CR3 1N4148-1
R69 59K
R68 1K
CR1 1N4148-1
TP1
C64 10
C2 160PF 200V
R10 61.9K ±1% 1/8W
U1
MR
VDD
VSS
C4 1000PF 100V
R12 2200
R13 1K
CR32 1N4148-1
Q5 2N2222A
R79 4700
C3 0.1 100V
R16 5600 1W ±5%
CR25 1N5619
CR31 1N5619
CR7 1N5615
C19 68 6V
CR5 1N5615
Q6 2N6547
E1
A 21B
B 21B
T2
C 11B
D 11B
R81 5600
+12V (J)
E 11B
REV F
ORIENTATION MARK
FIG A
TOP VIEW
NUMBERS ARE FOR REFERENCE ONLY
FIG B
EL1WL084

NOTES
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S)
2. UNLESS OTHERWISE SPECIFIED
   A. RESISTANCE VALUES ARE IN OHMS AND ARE 1/4W, ±2%
   B. CAPACITANCE VALUES ARE IN MICROFARADS AND ARE 50V ±10%
   C. ALL VOLTAGES ARE DC

TABLE 1

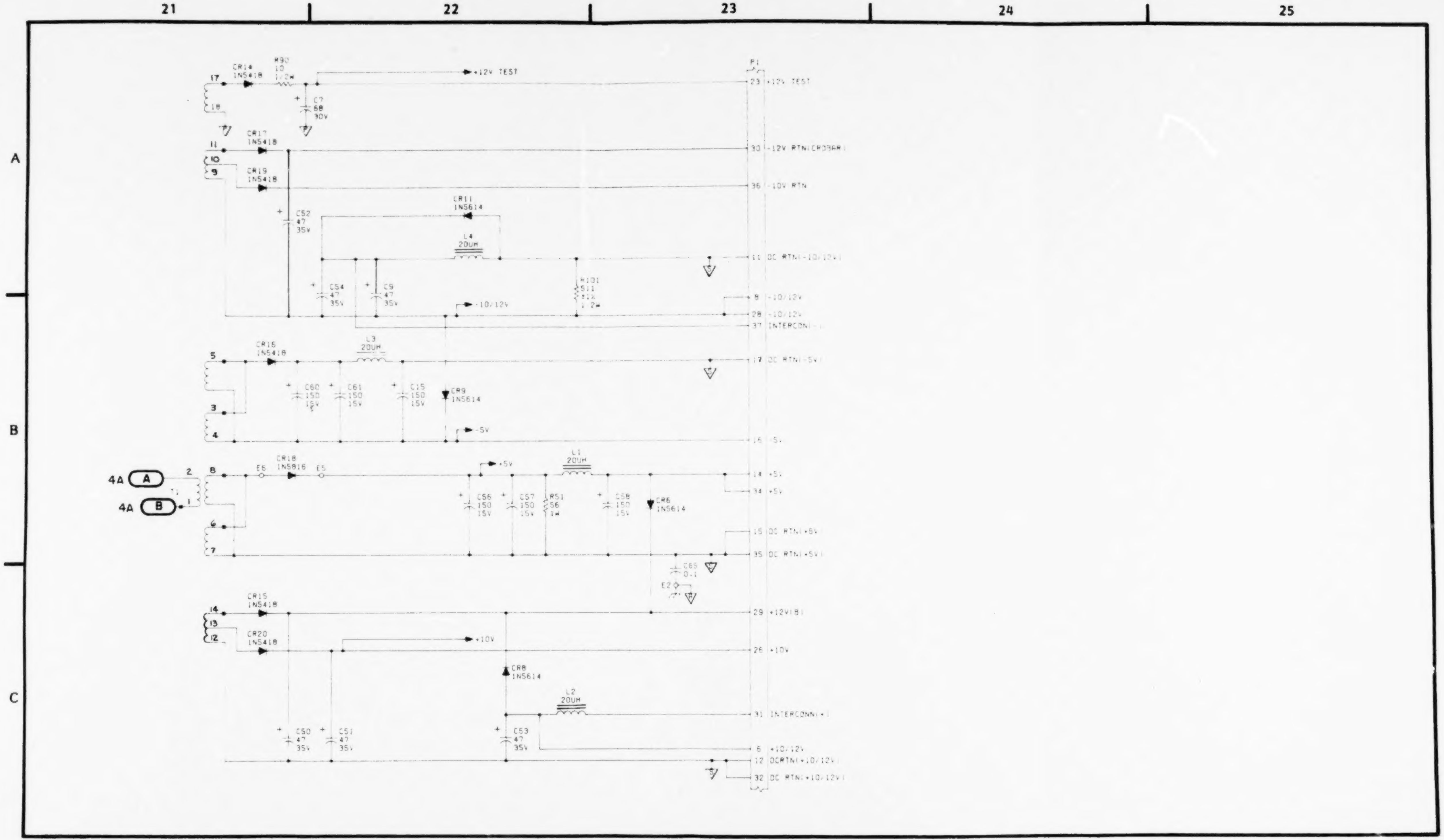
REF ES	TYPE NO	FIG LTR
U1	G166709-1	A
U2	G166712-1	A
U3	G166710-1	B
U4	G166713-1	A
U5,6,7	G166711-1	A

Figure FO-17. Multi Vdc CCA A2 Schematic Diagram (Sheet 1 of 4)


11
12
13
14
15
A
B
C
P1
NUCLEAR SHUT DOWN
27
CROBAR FAULT
25
CR29 1N649-1
CR28 1N649-1
Q7 2N3028
A
G
K
4B C
4B D
4B E
34A F
C38 1000PF 100V
C33 1000PF 100V
R21 100
R19 100
VR8 1N751A 5.1V
VR11 1N4622 3.9V
R22 1K
+12V(J1)
R20 169 ±1%
TP5
U2
C32 47PF 100V
C39 0.1
R24 10K
R25 1K
C17 0.01
R26 1M ±5%
C16 47PF 100V
U3
C42 0.1
C30 0.1
R42 100
R27 10K
+5V
R76 1K
+10V
R23 10K 1/8W ±1%
R80 221K 1/8W ±1%
R100 511 1/2W ±1%
R28 3650 1/8W ±1%
R43 301 1/8W ±1%
R38 20K 1/8W ±1%
R83 20K 1/8W ±1%
R33 22
+12V(J1)
R41 100
C27 0.1
U4
R31 1620 1/8W ±1%
R30 1K
R32 4420 1/8W ±1%
R75 1500
C13 1000PF 100V
C14 0.1
C40 33 10V
P1
40 CMPTR TEST
13 +10/12V ADJ
19 +10/12V ADJ
3 +5V REF

EL1WL085

Figure FO-17. Multi Vdc CCA A2
Schematic Diagram
(Sheet 2 of 4)


21
22
23
24
25
A
B
C
17
18
CR14
1N5418
R90
10
1/2W
+12V TEST
C7
68
30V
P1
23 +12V TEST
11
10
9
CR17
1N5418
30 -12V RTN(CROBAR)
CR19
1N5418
36 -10V RTN
C52
47
35V
CR11
1N5614
L4
20UH
11 DC RTN(-10/12V)
C54
47
35V
C9
47
35V
-10/12V
R101
511
±1%
1/2W
8 -10/12V
28 -10/12V
37 INTERCON(-)
5
CR16
1N5418
L3
20UH
17 DC RTN(-5V)
C60
150
15V
C61
150
15V
C15
150
15V
CR9
1N5614
3
4
-5V
16 -5V
4A
A
4A
B
2
1
T1
8
E6
CR18
1N5816
E5
+5V
L1
20UH
14 +5V
34 +5V
C56
150
15V
C57
150
15V
R51
56
1W
C58
150
15V
CR6
1N5614
6
7
15 DC RTN(+5V)
35 DC RTN(+5V)
C65
0.1
E2
14
13
12
CR15
1N5418
29 +12V(B)
CR20
1N5418
+10V
26 +10V
CR8
1N5614
L2
20UH
31 INTERCONN(+)
C50
47
35V
C51
47
35V
C53
47
35V
6 +10/12V
12 DCRTN(+10/12V)
32 DC RTN(+10/12V)

EL1WL086

Figure FO-17. Multi Vdc CCA A2
Schematic Diagram
(Sheet 3 of 4)

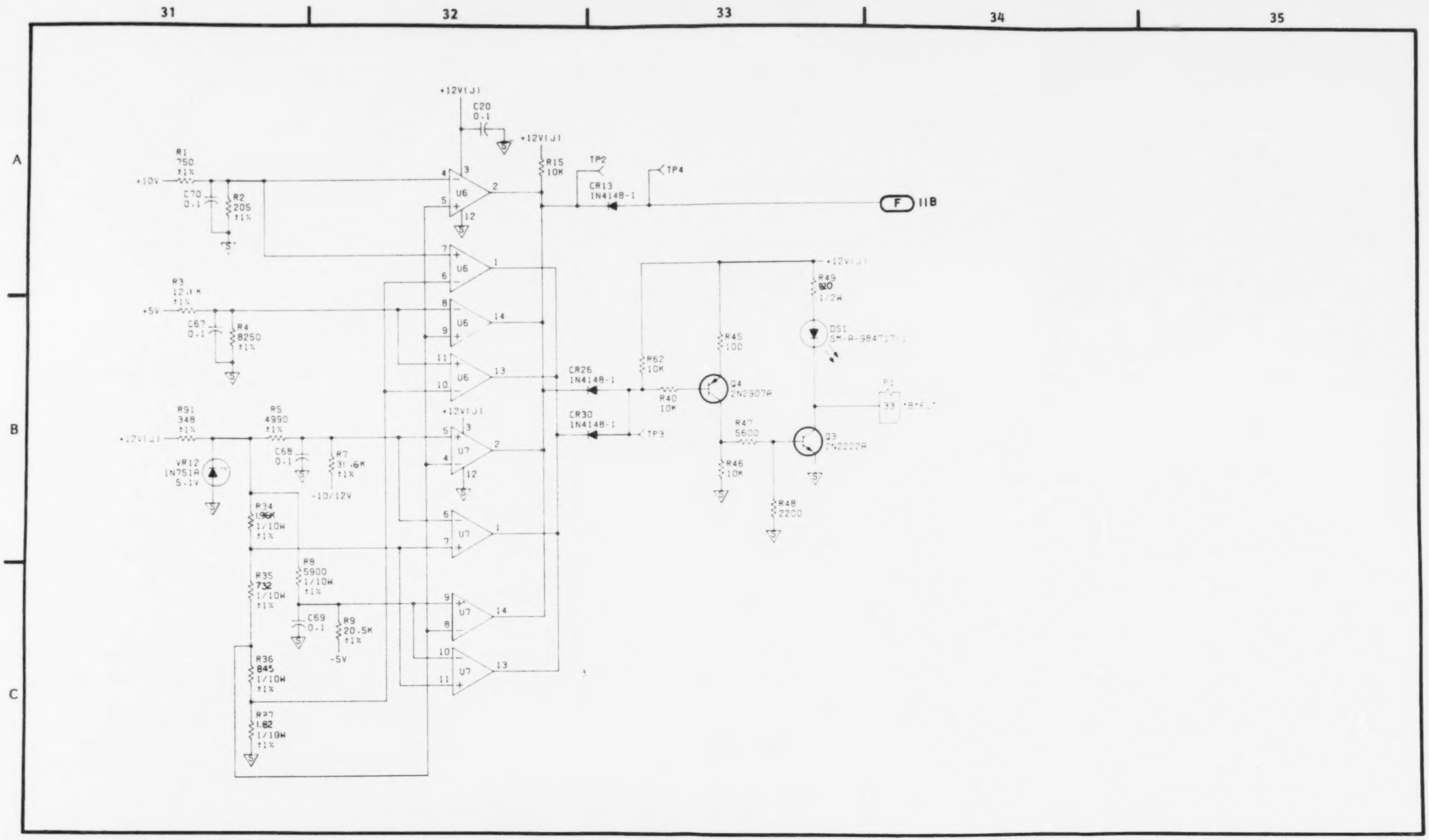
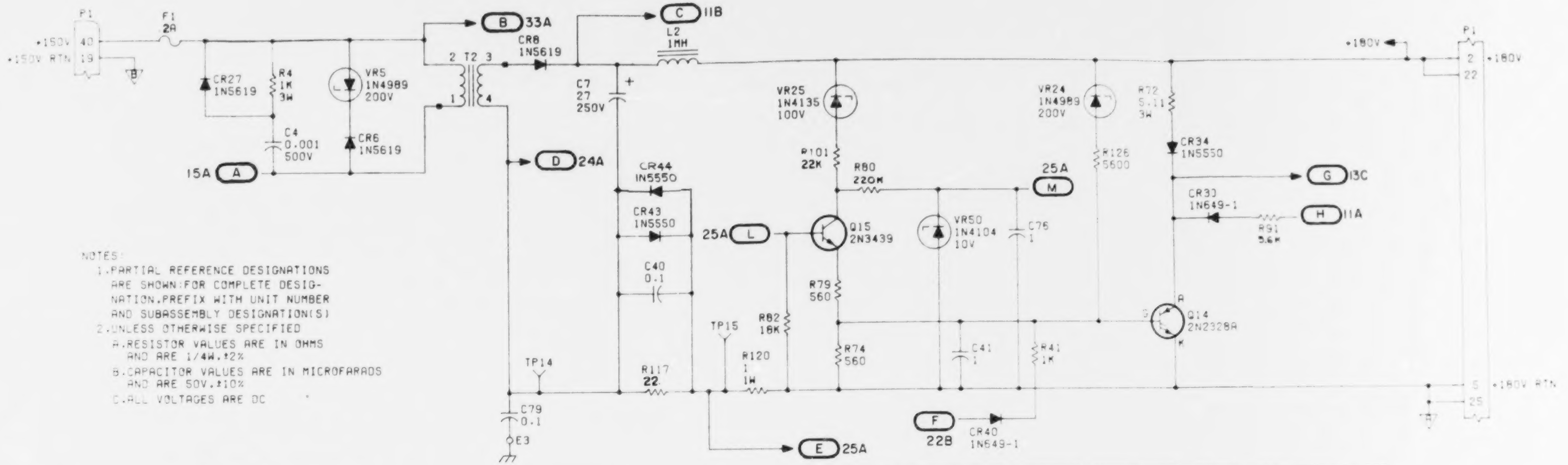

31
32
33
34
35
A
B
C
+12V(J)
C20
0.1
+12V(J)
R15
10K
TP2
TP4
CR13
1N4148-1
F
11B
R1
750
±1%
+10V
C70
0.1
R2
205
±1%
U6
U6
U6
U6
R3
12.1K
±1%
+5V
C67
0.1
R4
8250
±1%
+12V(J)
R49
820
1/2W
DS1
SM-A-984717-1
R45
100
R62
10K
CR26
1N4148-1
R40
10K
Q4
2N2907A
P1
33
"B"FLT
CR30
1N4148-1
TP3
R47
5600
Q3
2N2222A
R46
10K
R48
2200
R91
348
±1%
+12V(J)
VR12
1N751A
5.1V
R5
4990
±1%
C68
0.1
R7
31.6K
±1%
-10/12V
+12V(J)
U7
U7
U7
U7
R34
196K
1/10W
±1%
R8
5900
1/10W
±1%
R35
732
1/10W
±1%
C69
0.1
R9
20.5K
±1%
-5V
R36
845
1/10W
±1%
R37
1.82
1/10W
±1%
EL1WL087

Figure FO-17. Multi Vdc CCA A2
Schematic Diagram
(Sheet 4 of 4)


1
2
3
4
5
A
B
C
P1
+150V
+150V RTN
40
19
F1
2A
CR27
1N5619
R4
1K
3W
VR5
1N4989
200V
C4
0.001
500V
CR6
1N5619
15A
A
B
33A
2 T2 3
1
4
CR8
1N5619
C
11B
L2
1MH
C7
27
250V
D
24A
CR44
1N5550
CR43
1N5550
C40
0.1
TP14
C79
0.1
E3
R117
22
TP15
R120
1
1W
R82
18K
25A
L
E
25A
VR25
1N4135
100V
R101
22K
R80
220K
Q15
2N3439
R79
560
R74
560
VR50
1N4104
10V
C41
1
C76
1
R41
1K
M
25A
F
22B
CR40
1N649-1
VR24
1N4989
200V
R126
5600
R72
5.11
3W
CR34
1N5550
G
13C
CR33
1N649-1
R91
5.6K
H
11A
Q14
2N2328A
A
G
K
+180V
P1
2
22
+180V
5
25
+180V RTN

NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S)
2. UNLESS OTHERWISE SPECIFIED
   A. RESISTOR VALUES ARE IN OHMS AND ARE 1/4W, ±2%
   B. CAPACITOR VALUES ARE IN MICROFARADS AND ARE 50V, ±10%
   C. ALL VOLTAGES ARE DC

TABLE 1

REF DES	TYPE	POWER PINS		FIG LTR	ESD
		+12V	GND		
U1.3.9	M38510/10304BCB	11	6	A	-
U2.4	SM-A-959303	7	4	B	-
U5.7.8	SM-A-959304	14	7	A	-
U10.11	M38510/11201BCB	3	12	A	-

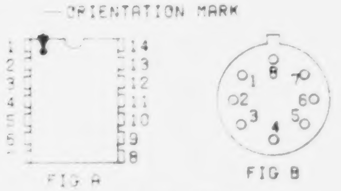

ORIENTATION MARK
1
2
3
4
5
6
7
14
13
12
11
10
9
8
1
2
3
4
5
6
7
8

FIG A

FIG B

TOP VIEW
NUMBERS ARE FOR REFERENCE ONLY

TABLE 2

REF DES	
HIGHEST USED	NOT USED
C96	C6.20.21.23. 36.37.39.45. 46.49.53.56. 58-71.73.74. 77.78.81-84. 86.89.92-94
CR85	CR1.7.10.11. 13.18.20.25. 29.31.33.35-37. 39.41.42. 45-60. 65-82
DS1	
E9	E4-8
F1	
L2	
P1	
Q16	Q6.10.11.13

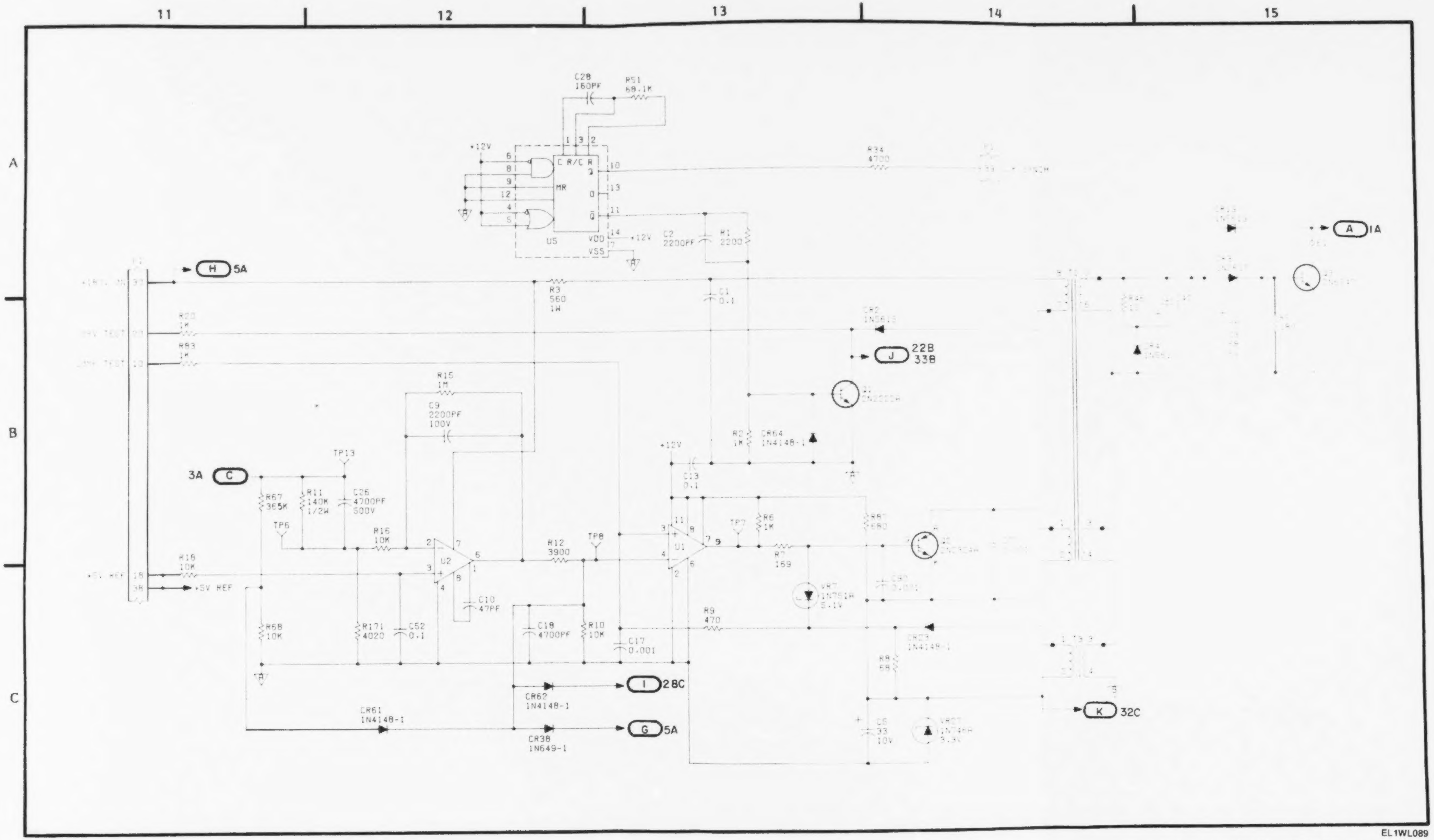
CONTINUED

REF DES	
HIGHEST USED	NOT USED
R171	R17.25.27.33. 37.42-45. 49.52-57. 59.61.69.71. 73.75.77.78. 84.85.88-90. 94.102-109. 115.123-125. 127-146.148.149. 151-161.163-169
T6	
TP15	
U11	U6
VR50	VR1-5.6.8. 9.10.12.15-21 23.26.28-49

REV E

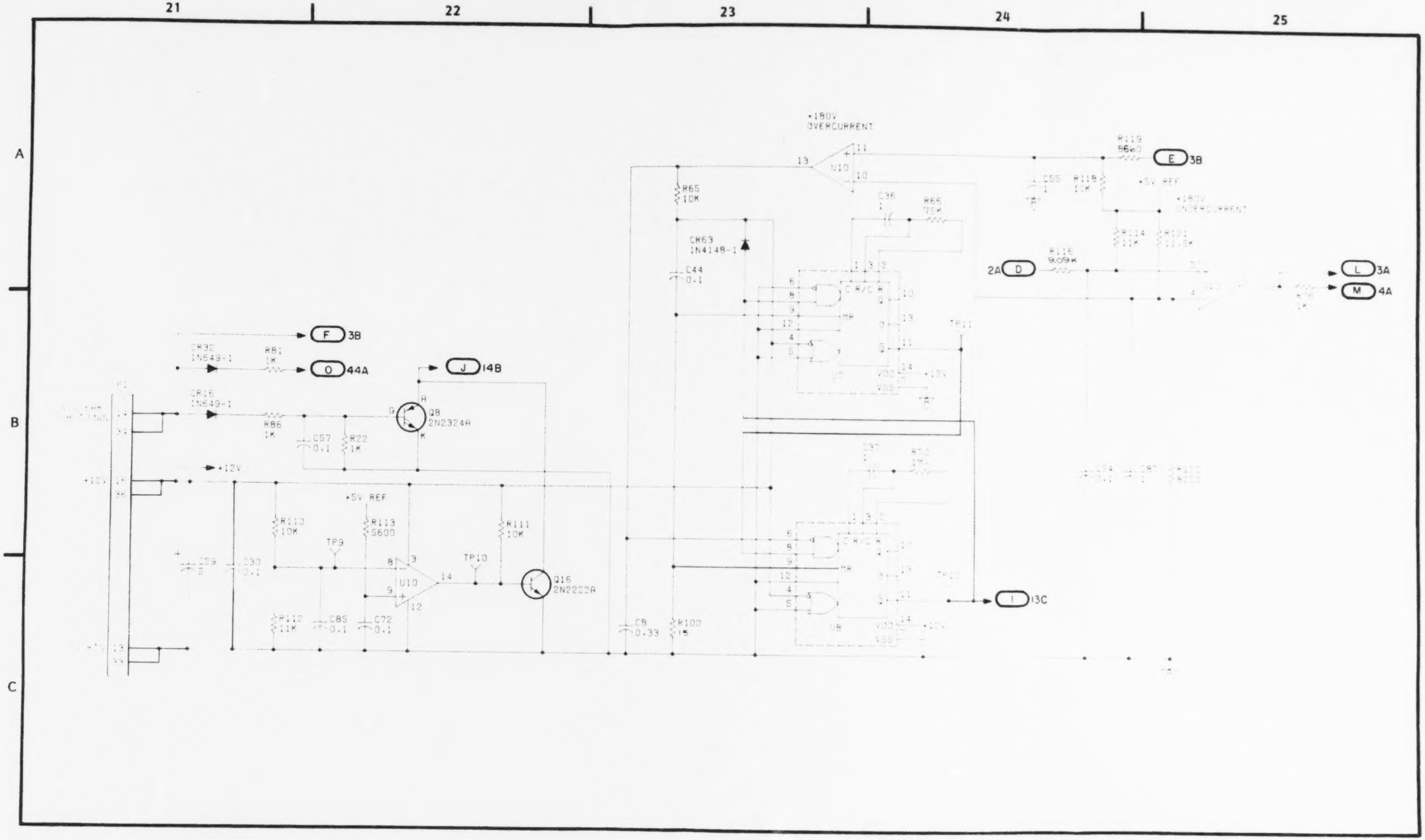
EL1WL088

Figure FO-18. 52/180 Vdc CCA A3
Schematic Diagram
(Sheet 1 of 5)


11
12
13
14
15
A
B
C
C28
160PF
R51
68.1K
+12V
C R/C R
Q
MR
O
Q̄
VDD
VSS
U5
+12V
C2
2200PF
R1
2200
R34
4700
H
5A
R3
560
1W
C1
0.1
R20
1K
R83
1K
CR2
1N5615
J
22B
33B
A
1A
R15
1M
C9
2200PF
100V
Q1
2N2222A
R2
1K
CR64
1N4148-1
+12V
C13
0.1
TP13
3A
C
R67
365K
R11
140K
1/2W
C26
4700PF
500V
TP6
R16
10K
U2
R18
10K
+5V REF
R12
3900
TP8
U1
TP7
R6
1K
R87
680
R7
169
VR7
1N751A
5.1V
C10
47PF
R68
10K
R171
4020
C52
0.1
C18
4700PF
R10
10K
C17
0.001
R9
470
CR23
1N4148-1
R8
68
I
28C
CR62
1N4148-1
CR61
1N4148-1
CR38
1N649-1
G
5A
C5
33
10V
K
32C

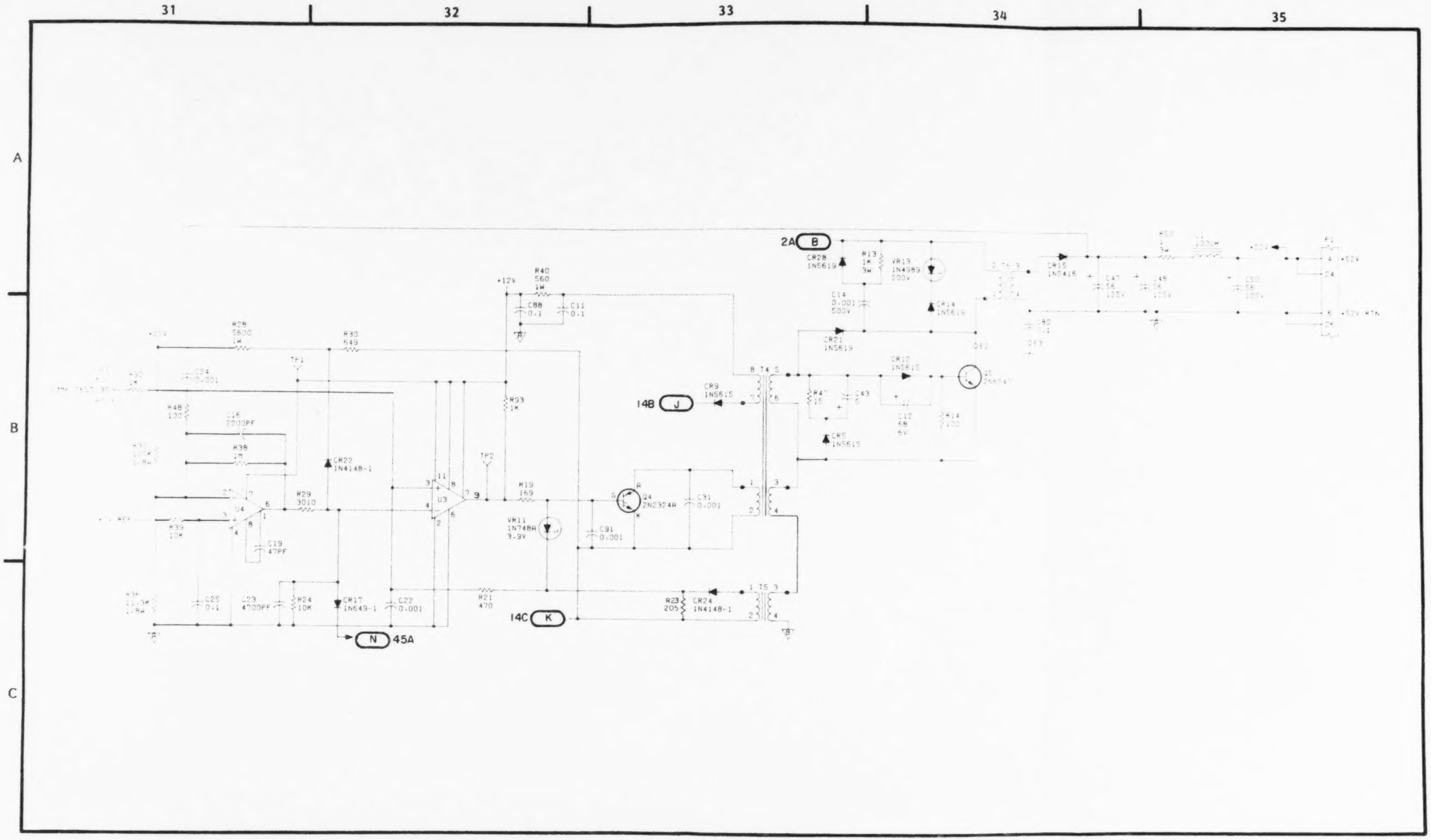
EL1WL089

Figure FO-18. 52/180 Vdc CCA A3
Schematic Diagram
(Sheet 2 of 5)


21
22
23
24
25
A
B
C
+180V
OVERCURRENT
U10
13
11
10
R119
56.0
E
3B
C55
1
R118
10K
+5V REF
+180V
UNDERCURRENT
R65
10K
C36
1
R66
75K
CR63
1N4148-1
C44
0.1
R114
11K
R121
11.5K
R116
9.09K
2A
D
L
3A
M
4A
1K
C R/C R
MR
Q
TP11
U7
VDD
VSS
+12V
F
3B
CR32
1N649-1
R81
1K
O
44A
J
14B
P1
CR16
1N649-1
R86
1K
C57
0.1
R22
1K
Q8
2N2324A
G
A
K
+12V
+12V
C37
1
R70
1M
C34
0.1
C87
1
R122
5600
+5V REF
R110
10K
R113
5600
R111
10K
TP9
TP10
C29
5
C30
0.1
U10
8
9
3
14
12
Q16
2N2222A
R112
11K
C85
0.1
C72
0.1
C8
0.33
R100
15
U8
TP12
I
13C
14
34
16
36
13
33

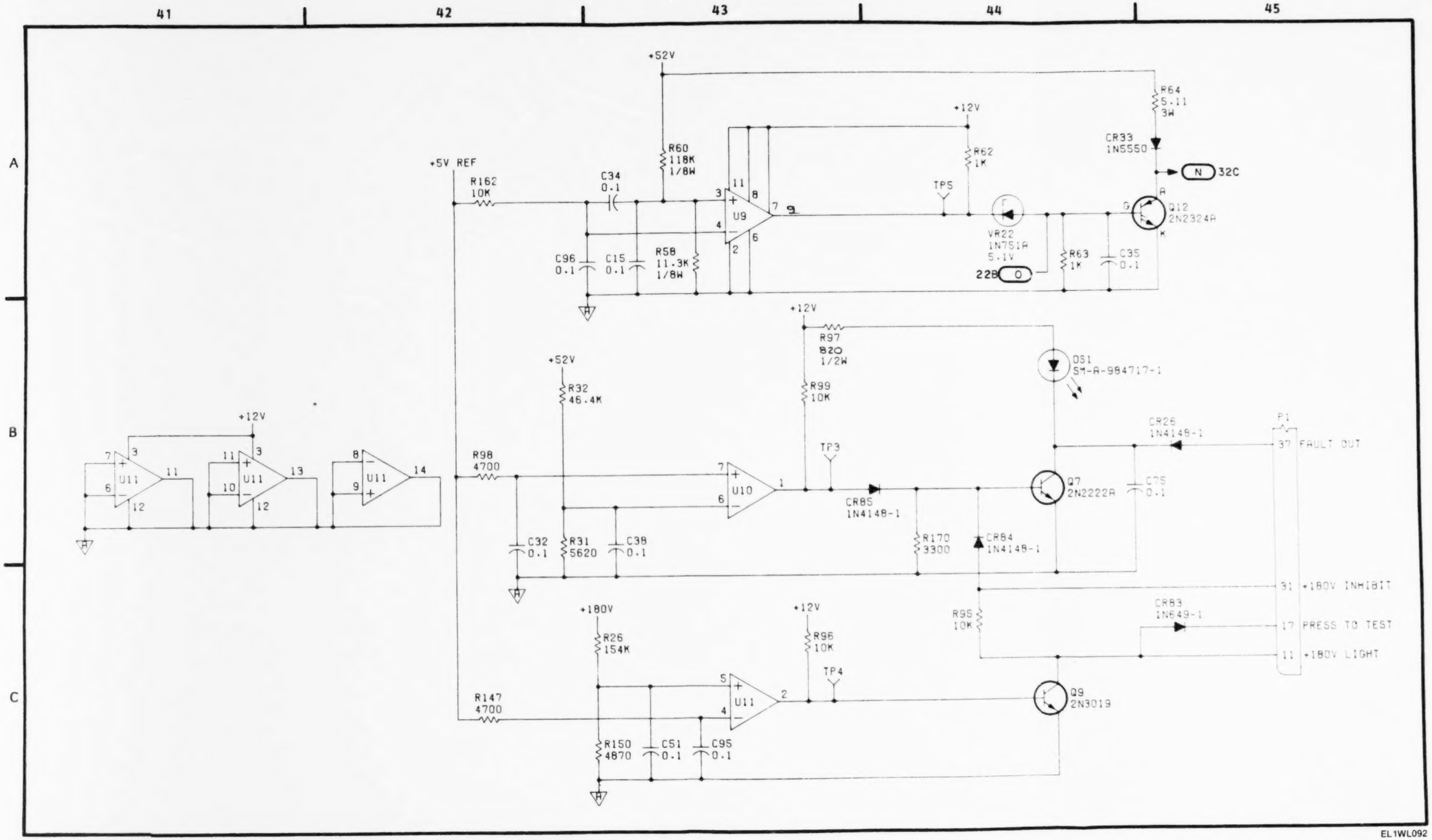
EL1WL090

Figure FO-18. 52/180 Vdc CCA A3 Schematic Diagram (Sheet 3 of 5)


31
32
33
34
35
A
B
C
+12V
R40
560
1W
C88
0.1
C11
0.1
R28
5600
1W
R30
649
TP1
C24
0.001
R48
100
C16
2200PF
R38
1M
CR22
1N4148-1
U4
R29
3010
R39
10K
C19
47PF
U3
TP2
R93
1M
R19
169
VR11
1N748A
3.9V
C91
0.001
Q4
2N2324A
C31
0.001
R21
470
C25
0.1
C23
4700PF
R24
10K
CR17
1N649-1
C22
0.001
N 45A
14C K
R23
205
CR24
1N4148-1
T5
T4
14B J
CR9
1N5615
2A B
CR28
1N5619
R13
1K
3W
VR13
1N4989
200V
C14
0.001
500V
CR14
1N5619
CR21
1N5619
R47
15
C43
5
CR12
1N5615
C12
68
6V
R14
100
CR5
1N5615
CR15
1N5416
C47
56
125V
C48
56
125V
C50
56
125V
+52V
+52V RTN

EL1WL091

Figure FO-18. 52/180 Vdc CCA A3 Schematic Diagram (Sheet 4 of 5)


41
42
43
44
45
A
B
C
+52V
+5V REF
R162
10K
C34
0.1
R60
118K
1/8W
U9
3
4
11
8
2
6
7
9
C96
0.1
C15
0.1
R58
11.3K
1/8W
+12V
R62
1K
TP5
VR22
1N751A
5.1V
228
O
R63
1K
C35
0.1
R64
5.11
3W
CR33
1N5550
N
32C
Q12
2N2324A
G
A
K
+12V
R97
820
1/2W
R99
10K
DS1
SM-A-984717-1
+52V
R32
46.4K
R98
4700
U10
7
6
1
TP3
CR85
1N4148-1
R170
3300
CR84
1N4148-1
Q7
2N2222A
C75
0.1
CR26
1N4148-1
P1
37 FAULT OUT
31 +180V INHIBIT
17 PRESS TO TEST
11 +180V LIGHT
CR83
1N649-1
R95
10K
C32
0.1
R31
5620
C38
0.1
+12V
U11
7
6
3
12
11
10
13
8
9
14
+180V
R26
154K
+12V
R96
10K
TP4
R147
4700
U11
5
4
2
Q9
2N3019
R150
4870
C51
0.1
C95
0.1

EL1WL092

Figure FO-18. 52/180 Vdc CCA A3 Schematic Diagram (Sheet 5 of 5)

NOTES
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S)
2. UNLESS OTHERWISE SPECIFIED
   A. RESISTER VALUES ARE IN OHMS AND ARE 1/4W, ±2%
   B. CAPACITOR VALUES ARE IN MICROFARADS AND ARE 50V, ±10%
   C. ALL VOLTAGES ARE DC

TABLE 1

REF DES	TYPE	POWER PINS		FIG LTR	ESD
		+10V	GND		
U1	SM-A-959304	14	7	A	-
U2	4N24	-	-	A	-

TABLE 2

REF DES	
HIGHEST USED	NOT USED
C16	C11.12.13
CR45	CR12.18.20. 25.28 33-37. 39-41
DS1	
E7	
K2	
P1	
Q10	
R29	R3.19-21
T3	
TP7	
U2	
VR19	VR2-5.7-18

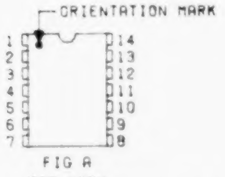
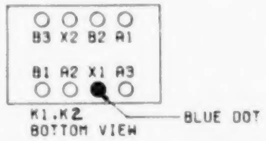
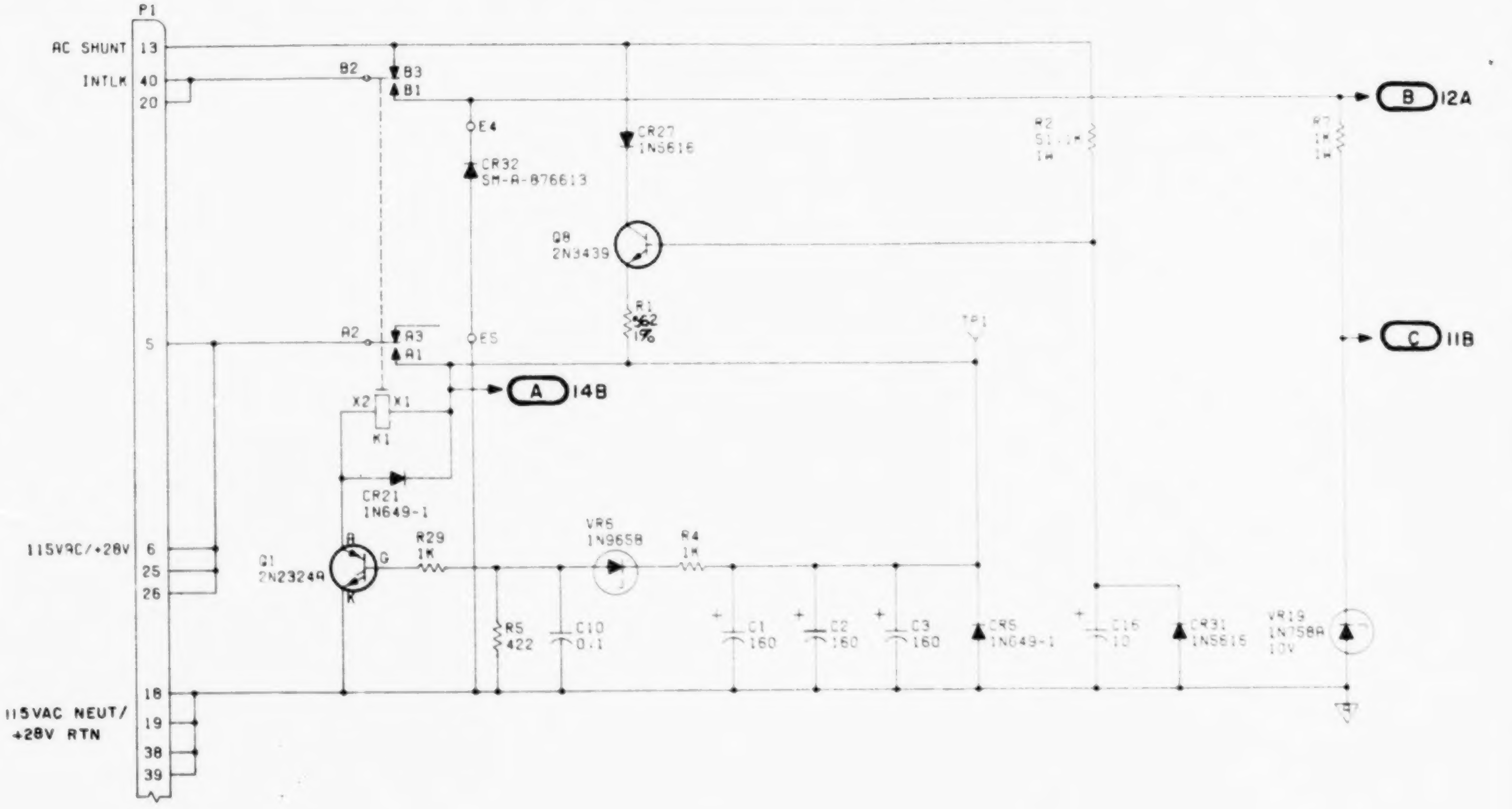

ORIENTATION MARK
1
2
3
4
5
6
7
14
13
12
11
10
9
8

FIG A
TOP VIEW
NUMBERS ARE FOR REFERENCE ONLY


B3 X2 B2 A1
B1 A2 X1 A3
BLUE DOT

K1,K2
BOTTOM VIEW


1
2
3
4
5
A
B
C
P1
AC SHUNT
INTLK
13
40
20
5
115VAC/+28V
6
25
26
18
19
38
39
115VAC NEUT/
+28V RTN
B2
B3
B1
A2
A3
A1
E4
E5
CR32
SM-A-876613
CR27
1N5616
Q8
2N3439
R1
562
1%
X2
X1
K1
A
14B
CR21
1N649-1
Q1
2N2324A
A
G
K
R29
1K
R5
422
C10
0.1
VR6
1N965B
R4
1K
C1
160
C2
160
C3
160
CR5
1N649-1
TP1
R2
51.1K
1W
C16
10
CR31
1N5615
R7
1K
1W
VR19
1N758A
10V
B
12A
C
11B
REV E

EL1WL093

Figure FO-19. Dc Input CCA A4 Schematic Diagram (Sheet 1 of 3)

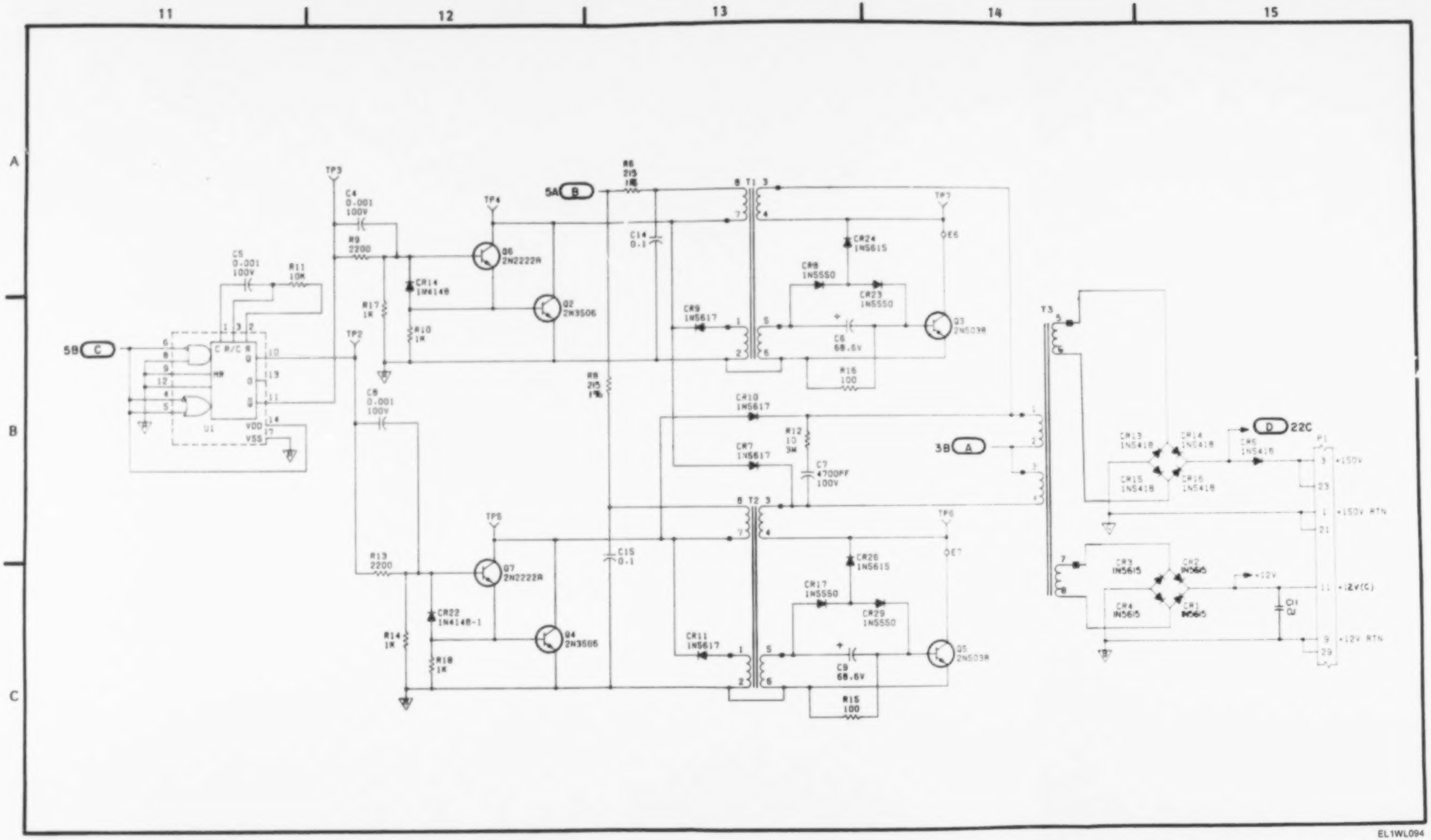

11
12
13
14
15
A
B
C
5B C
U1
C R/C R
MR
Q
VDD
VSS
C5
0.001
100V
R11
10M
TP3
C4
0.001
100V
R9
2200
TP2
C8
0.001
100V
R17
1K
CR14
1N4148
R10
1K
TP4
Q6
2N2222A
Q2
2N3506
TP5
R13
2200
Q7
2N2222A
R14
1K
CR22
1N4148-1
R18
1K
Q4
2N3506
5A B
R6
215
1%
R8
215
1%
C14
0.1
C15
0.1
T1
T2
CR9
1N5617
CR10
1N5617
CR7
1N5617
CR11
1N5617
R12
10
3W
C7
4700PF
100V
TP7
E6
CR24
1N5615
CR8
1N5550
CR23
1N5550
C6
68.6V
R16
100
Q3
2N5038
TP6
E7
CR26
1N5615
CR17
1N5550
CR29
1N5550
C9
68.6V
R15
100
Q5
2N5038
3B A
T3
CR13
1N5418
CR14
1N5418
CR15
1N5418
CR16
1N5418
CR6
1N5418
D 22C
P1
+150V
+150V RTN
CR3
IN5615
CR2
IN5615
CR4
IN5615
CR1
IN5615
+12V
C11
0.1
+12V(C)
+12V RTN
EL1WL094

Figure FO-19. Dc Input CCA A4 Schematic Diagram (Sheet 2 of 3)

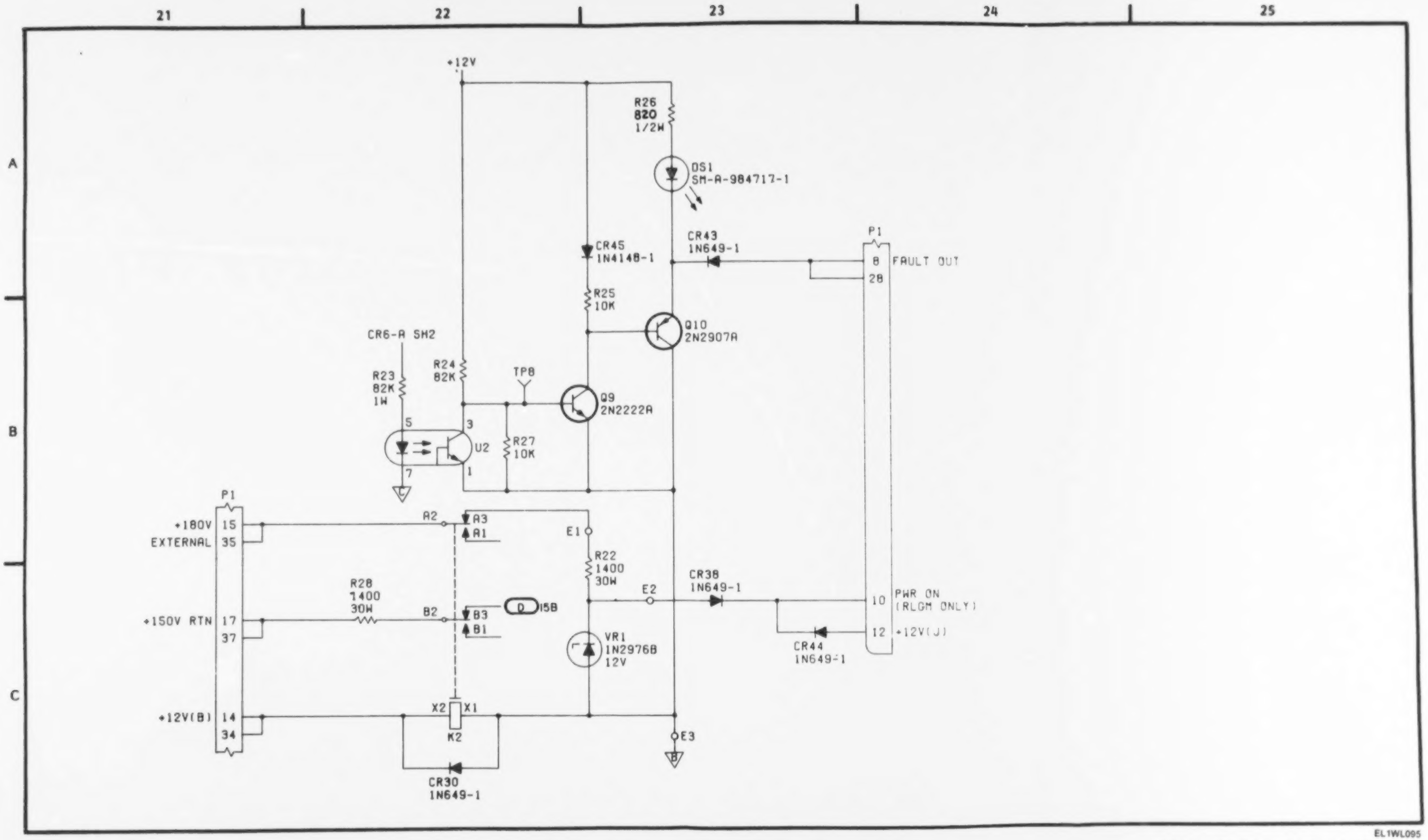
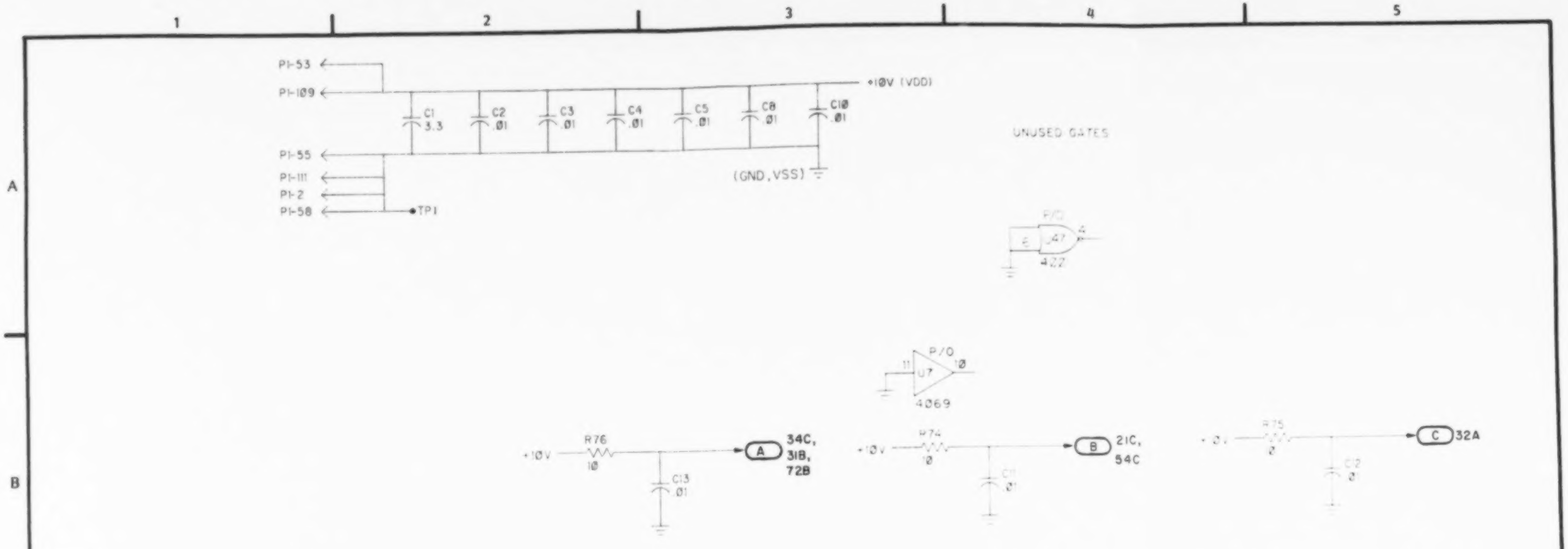

21
22
23
24
25
A
B
C
+12V
R26
820
1/2W
DS1
SM-A-984717-1
CR45
1N4148-1
CR43
1N649-1
P1
8
28
FAULT OUT
R25
10K
Q10
2N2907A
CR6-A SH2
R23
82K
1W
R24
82K
TP8
Q9
2N2222A
5
3
U2
R27
10K
7
1
P1
+180V
EXTERNAL
15
35
A2
A3
A1
E1
R22
1400
30W
R28
1400
30W
E2
CR38
1N649-1
10
PWR ON
(RLGM ONLY)
12
+12V(J)
CR44
1N649-1
+150V RTN
17
37
B2
B3
B1
D
15B
VR1
1N2976B
12V
+12V(B)
14
34
X2
X1
K2
E3
B
CR30
1N649-1
EL1WL095

Figure FO-19. Dc Input CCA A4 Schematic Diagram (Sheet 3 of 3)


1
2
3
4
5
A
B
P1-53
P1-109
+10V (VDD)
C1
3.3
C2
.01
C3
.01
C4
.01
C5
.01
C8
.01
C10
.01
P1-55
(GND,VSS)
P1-111
P1-2
P1-58
TP1
UNUSED GATES
P/O
E
U47
4
422
P/O
11
U7
10
4069
+10V
R76
10
C13
.01
A
34C,
31B,
72B
+10V
R74
10
C11
.01
B
21C,
54C
+10V
R75
10
C12
.01
C
32A

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. • DENOTES TEST POINT.
3. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTANCE VALUES ARE IN OHMS,1/4 WATT,±2%.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
4. THIS DIAGRAM CONFORMS TO ANSI Y32.14-1973 GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
5. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.
6. IC VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS:
   U6, U7, U8, U9, U13, U16, U19, U20, U25, U26, U28, U37, U41, U44 AND U45
   PIN 7 (VSS), PIN 14 (VDD)
   U11, U17, U23, U29 AND U31 PIN 8 (VSS), PIN 1 (VDD)
   U21, U22, AND U39 PIN 7,(VSS), PIN14 (VDD)
   U15 AND U21 PIN 7 (VSS)

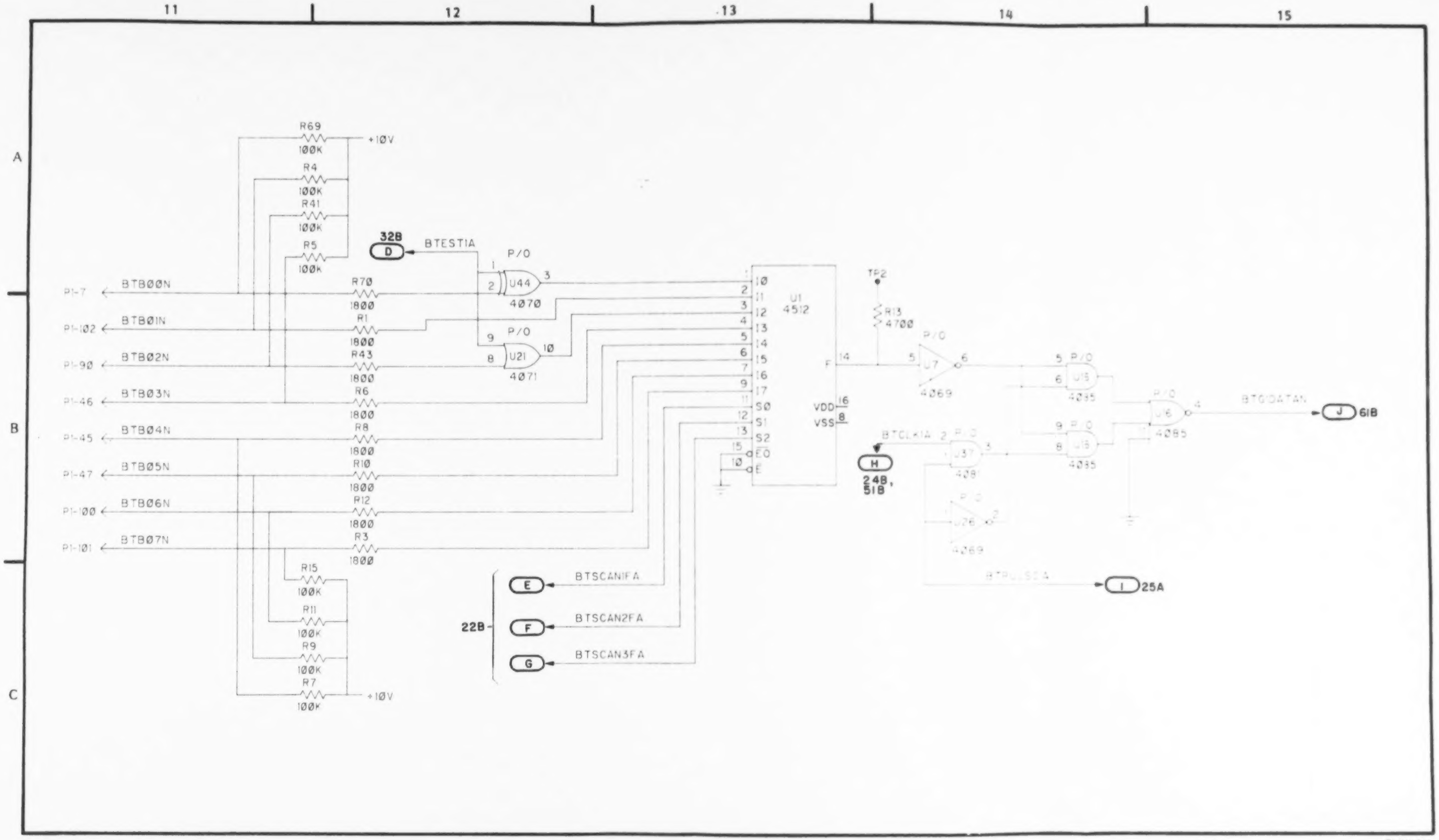
HIGHEST REFERENCE DESIGNATIONS		
C15	P1	Q1
U47	R76	TP6

REFERENCE DESIGNATIONS NOT USED		
C14	C15	R39
R40	R52	R68

REV G

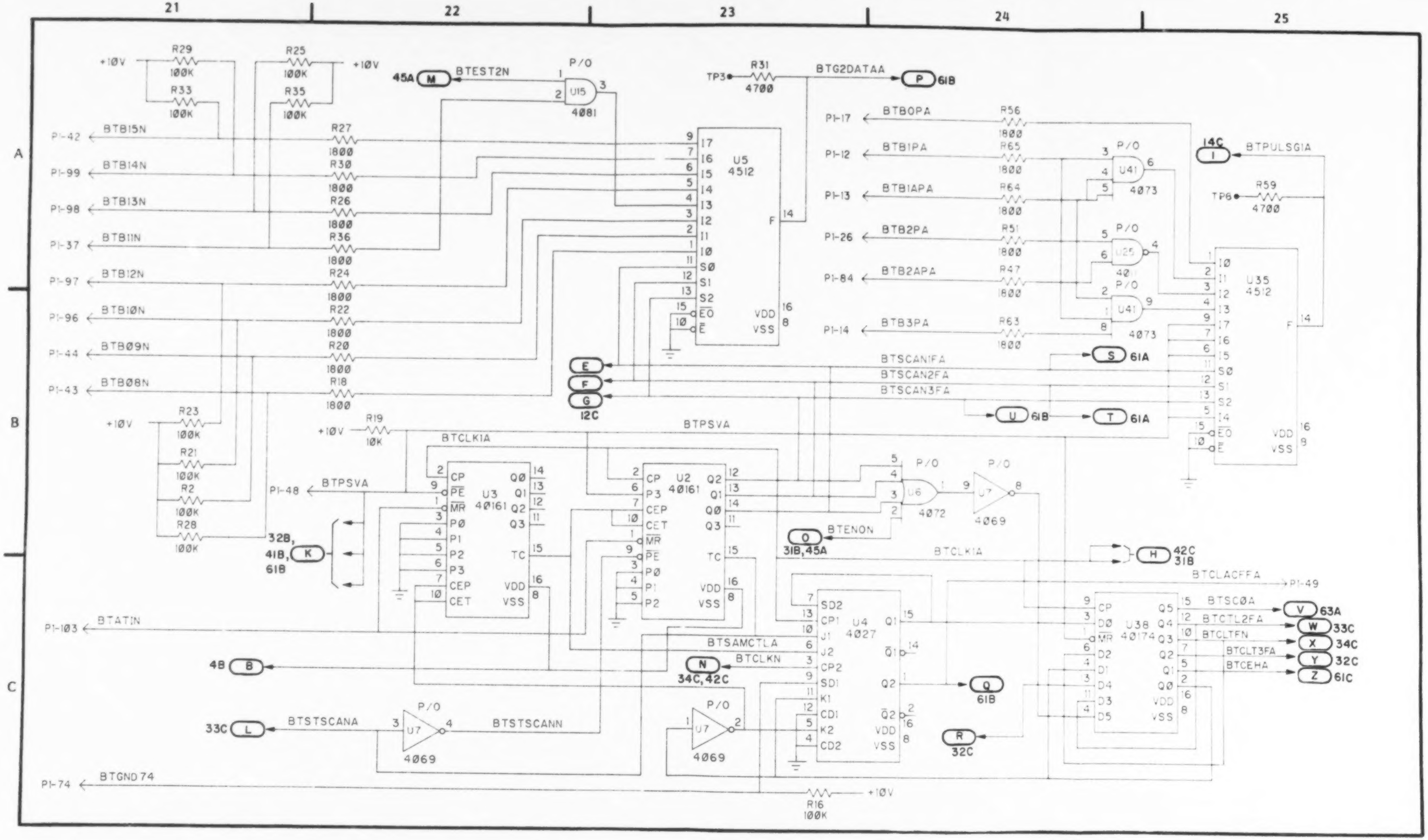
EL1WL096

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 1 of 8)


11
12
13
14
15
A
B
C
R69
100K
+10V
R4
100K
R41
100K
R5
100K
32B
D
BTESTIA
P/O
U44
4070
1
2
3
P1-7
BTB00N
R70
1800
P1-102
BTB01N
R1
1800
P1-90
BTB02N
R43
1800
P1-46
BTB03N
R6
1800
P1-45
BTB04N
R8
1800
P1-47
BTB05N
R10
1800
P1-100
BTB06N
R12
1800
P1-101
BTB07N
R3
1800
P/O
U21
4071
9
8
10
U1
4512
I0
I1
I2
I3
I4
I5
I6
I7
S0
S1
S2
E0
E
2
3
4
5
6
7
9
11
12
13
15
10
F
14
VDD 16
VSS 8
TP2
R13
4700
P/O
U7
4069
5
6
P/O
U15
4085
5
6
9
8
P/O
U16
4085
4
11
BTGIDATAN
J
61B
BTCLKIA
2
P/O
U37
4081
1
3
H
24B,
51B
P/O
U26
4069
1
2
BTPULSEA
I
25A
R15
100K
R11
100K
R9
100K
R7
100K
+10V
E
BTSCAN1FA
22B
F
BTSCAN2FA
G
BTSCAN3FA

EL1WL097

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 2 of 8)


21
22
23
24
25
A
B
C
+10V
R29 100K
R33 100K
R25 100K
R35 100K
+10V
45A M
BTEST2N
P/O U15 4081
TP3
R31 4700
BTG2DATAA
P 61B
P1-42 BTB15N R27 1800
P1-99 BTB14N R30 1800
P1-98 BTB13N R26 1800
P1-37 BTB11N R36 1800
P1-97 BTB12N R24 1800
P1-96 BTB10N R22 1800
P1-44 BTB09N R20 1800
P1-43 BTB08N R18 1800
U5 4512
I7 I6 I5 I4 I3 I2 I1 I0 S0 S1 S2 EO E F VDD VSS
P1-17 BTB0PA R56 1800
P1-12 BTB1PA R65 1800
P1-13 BTB1APA R64 1800
P1-26 BTB2PA R51 1800
P1-84 BTB2APA R47 1800
P1-14 BTB3PA R63 1800
P/O U41 4073
P/O U25 4081
P/O U41 4073
14C I BTPULSG1A
TP6 R59 4700
U35 4512
BTSCAN1FA
BTSCAN2FA
BTSCAN3FA
S 61A
E
F
G
12C
U 61B
T 61A
+10V R23 100K
R21 100K
R2 100K
R28 100K
32B, 41B, 61B K
+10V R19 10K
BTCLK1A
BTPSVA
P1-48 BTPSVA
U3 40161
CP PE MR P0 P1 P2 P3 CEP CET Q0 Q1 Q2 Q3 TC VDD VSS
U2 40161
P/O U6 4072
P/O U7 4069
O BTENON 31B, 45A
BTCLK1A
H 42C 31B
BTCLACFFA P1-49
P1-103 BTATIN
U4 4027
SD2 CP1 J1 J2 CP2 SD1 K1 CD1 K2 CD2 Q1 Q1 Q2 Q2 VDD VSS
BTSAMCTLA
4B B
N BTCLKN 34C, 42C
Q 61B
R 32C
U38 40174
CP D0 MR D2 D1 D4 D3 D5 Q5 Q4 Q3 Q2 Q1 Q0 VDD VSS
BTSC0A V 63A
BTCTL2FA W 33C
BTCLTFN X 34C
BTCLT3FA Y 32C
BTCEHA Z 61C
33C L BTSTSCANA
P/O U7 4069
BTSTSCANN
P/O U7 4069
P1-74 BTGND74
R16 100K +10V

EL1WL098

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 3 of 8)

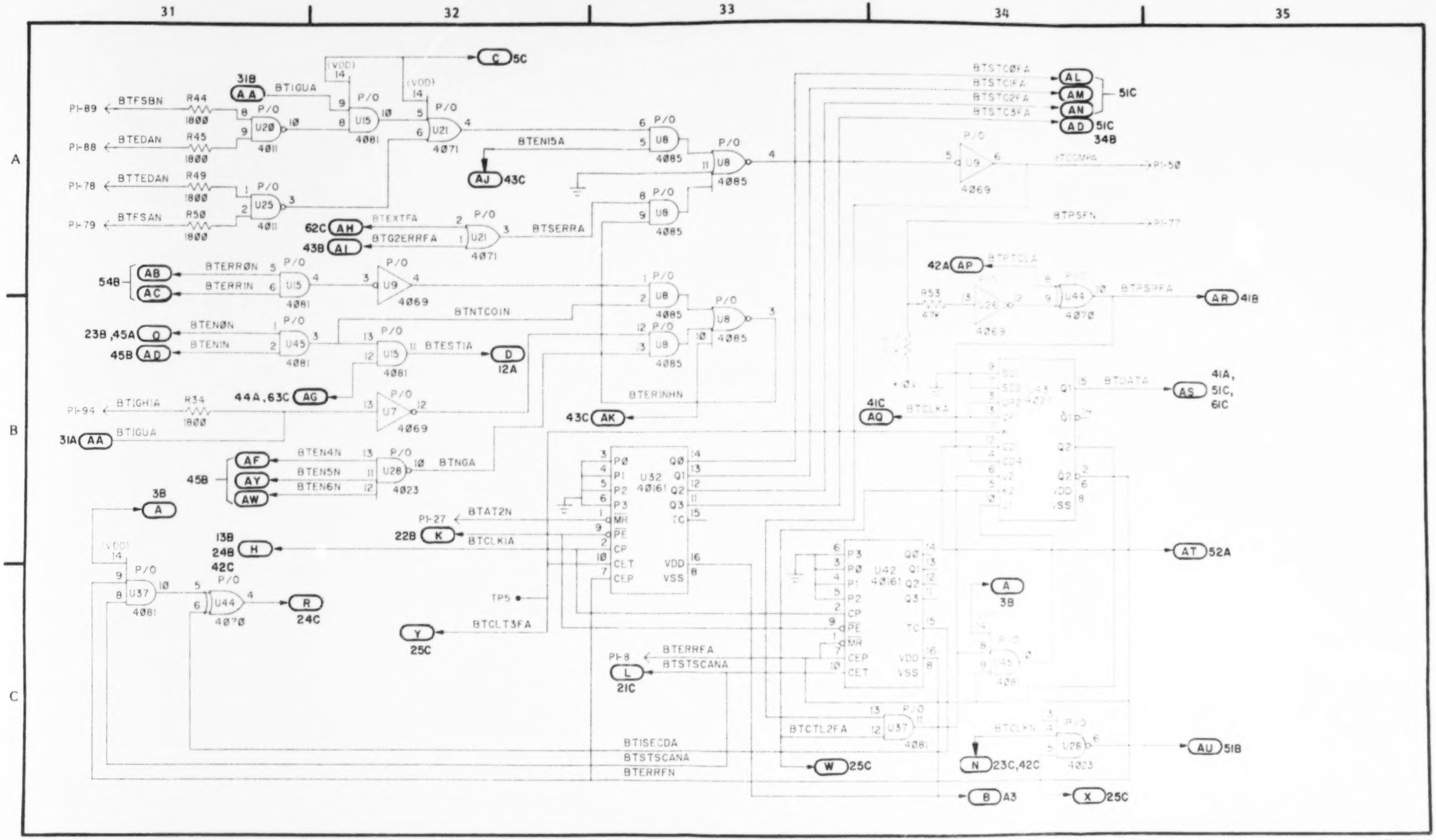

31
32
33
34
35
A
B
C
BTFSBN
BTEDAN
BTTEDAN
BTFSAN
P1-89
P1-88
P1-78
P1-79
R44
R45
R49
R50
1800
U20
U25
4011
31B
AA
BTIGUA
(VDD)
14
U15
4081
U21
4071
C
5C
BTEN15A
AJ
43C
U8
4085
U9
4069
BTSTC0FA
BTSTC1FA
BTSTC2FA
BTSTC3FA
AL
AM
AN
AD
51C
34B
BTCOMPA
P1-50
BTPSFN
P1-77
62C
AH
43B
AI
BTEXTFA
BTG2ERRFA
BTSERRA
54B
AB
AC
BTERR0N
BTERRIN
23B,45A
O
45B
AD
BTEN0N
BTEN1N
U45
BTNTCOIN
BTESTIA
D
12A
44A,63C
AG
P1-94
BTIGHIA
R34
31A
AA
BTIGUA
U7
BTERINHN
43C
AK
42A
AP
BTPTCLA
R53
47K
U26
U44
4070
BTPSRFA
AR
41B
41C
AQ
BTCLKA
U43
4027
BTDATA
AS
41A,
51C,
61C
45B
AF
AY
AW
BTEN4N
BTEN5N
BTEN6N
U28
4023
BTNGA
3B
A
U32
40161
P0
P1
P2
P3
MR
PE
CP
CET
CEP
Q0
Q1
Q2
Q3
TC
VDD
VSS
P1-27
BTAT2N
22B
K
BTCLKIA
13B
24B
42C
H
U37
4081
U44
4070
R
24C
TP5
Y
25C
BTCLT3FA
U42
40161
AT
52A
A
3B
U45
4081
P1-8
L
21C
BTERRFA
BTSTSCANA
BTCTL2FA
U37
W
25C
BTCLKN
N
23C,42C
U28
4023
AU
51B
BTISECDA
BTSTSCANA
BTERRFN
B
A3
X
25C
EL1WL099

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 4 of 8)

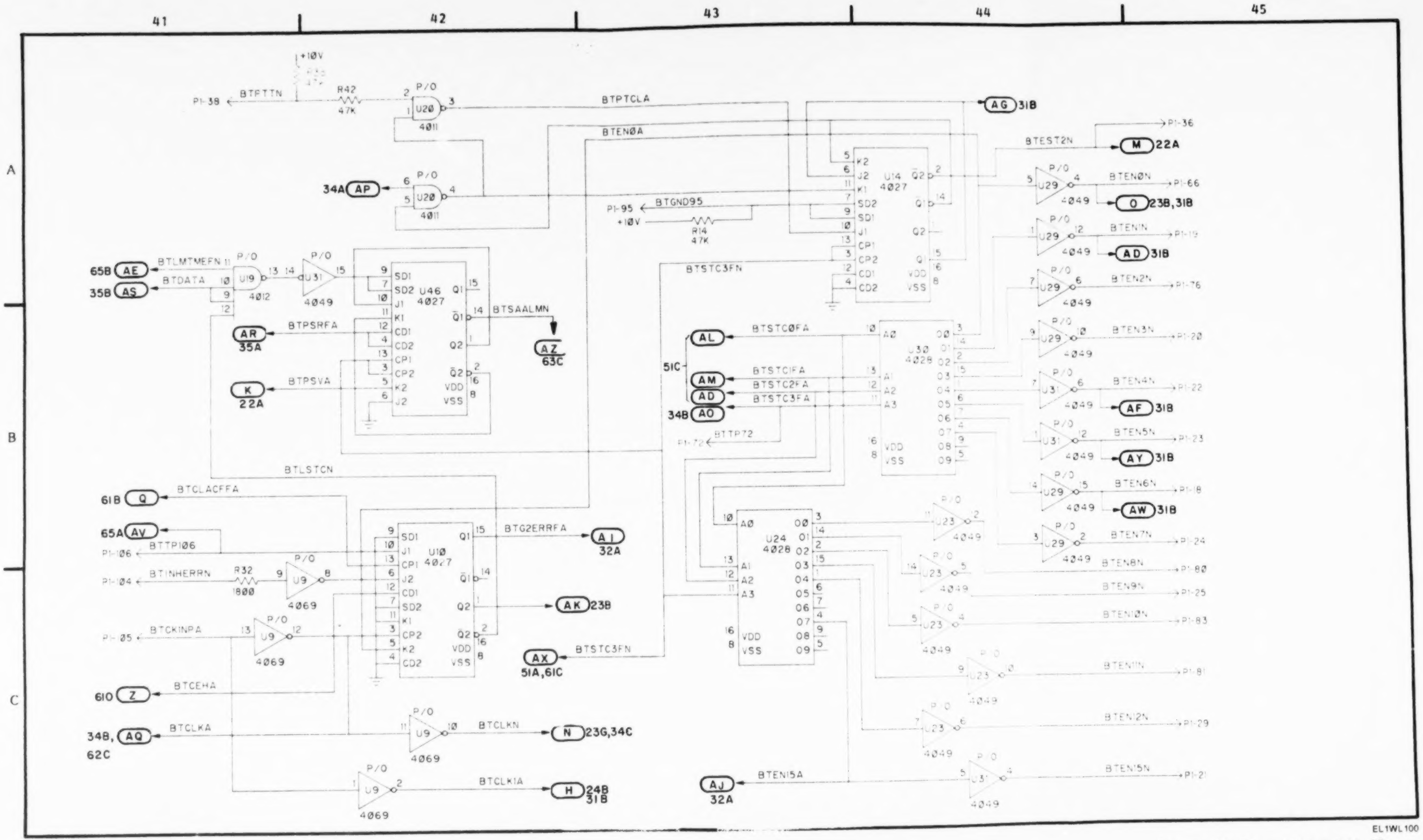
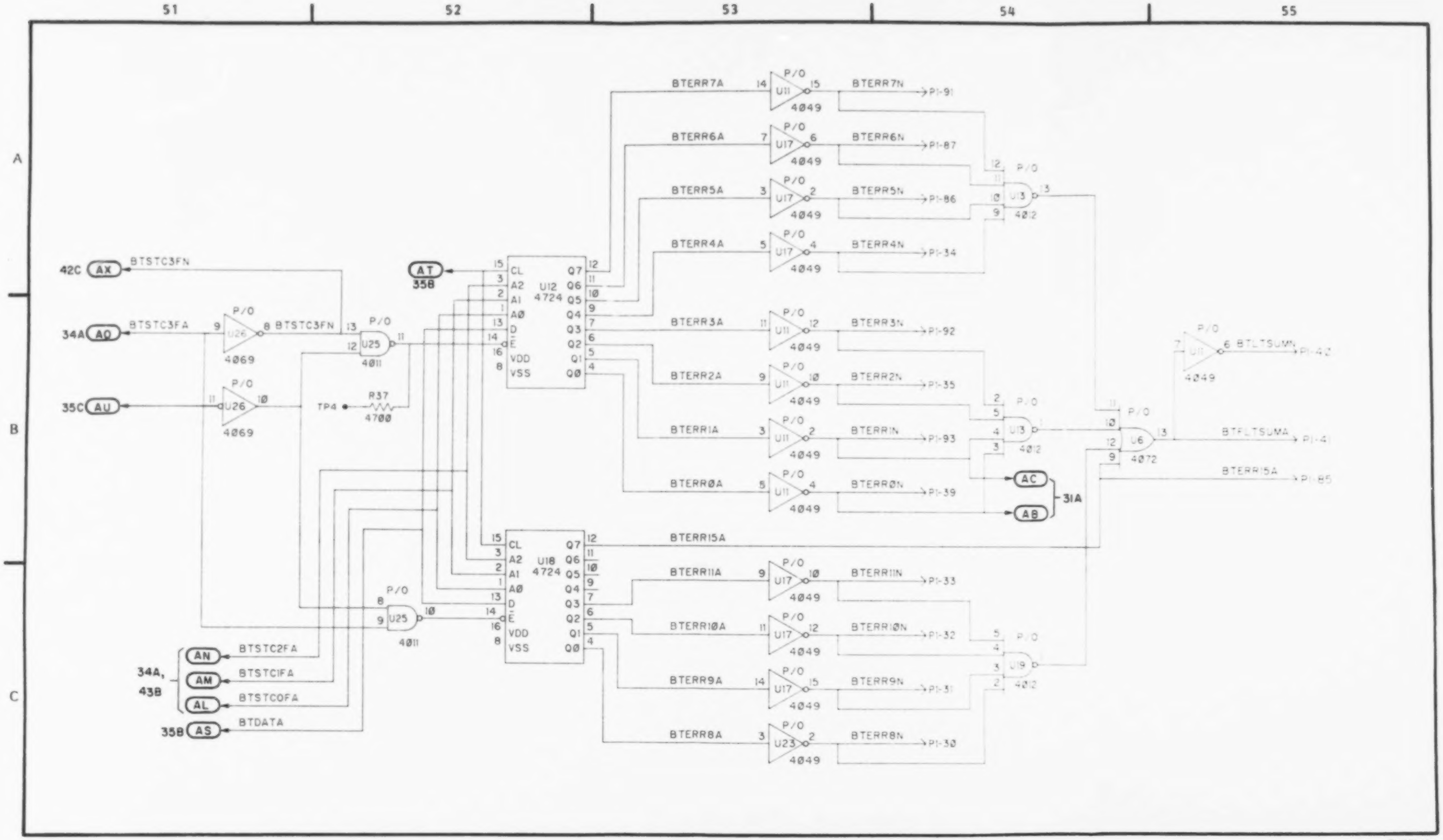

41
42
43
44
45
A
B
C
+10V
R42
47K
P1-38
BTFTTN
P/O
U20
4011
BTPTCLA
AG 31B
BTEN0A
34A AP
P1-95
BTGND95
+10V
R14
47K
U14
4027
K2
J2
K1
SD2
SD1
J1
CP1
CP2
CD1
CD2
VDD
VSS
BTEST2N
P1-36
M 22A
U29
4049
BTEN0N
P1-66
O 23B,31B
BTEN1N
P1-19
AD 31B
BTEN2N
P1-76
BTEN3N
P1-20
BTEN4N
P1-22
AF 31B
BTEN5N
P1-23
AY 31B
BTEN6N
P1-18
AW 31B
BTEN7N
P1-24
BTEN8N
P1-80
BTEN9N
P1-25
BTEN10N
P1-83
BTEN11N
P1-81
BTEN12N
P1-29
BTEN15N
P1-21
65B AE
BTLMTMEFN
35B AS
BTDATA
U19
4012
U31
4049
U46
4027
BTSAALMN
AZ 63C
AR 35A
BTPSRFA
K 22A
BTPSVA
BTSTC3FN
BTSTC0FA
AL
51C
AM
BTSTC1FA
AD
BTSTC2FA
34B AO
BTSTC3FA
P1-72
BTTP72
U30
4028
A0
A1
A2
A3
BTLSTCN
61B Q
BTCLACFFA
65A AV
P1-106
BTTP106
P1-104
BTINHERRN
R32
1800
U9
4069
U10
4027
BTG2ERRFA
AJ 32A
AK 23B
P1-05
BTCKINPA
AX 51A,61C
BTSTC3FN
U24
4028
U23
4049
610 Z
BTCEHA
34B, 62C AQ
BTCLKA
BTCLKN
N 23G,34C
BTCLK1A
H 24B 31B
AJ 32A
BTEN15A
EL1WL100

Figure FO-20. BITE 2 CCA A5
Schematic Diagram
(Sheet 5 of 8)


51
52
53
54
55
A
B
C
42C AX BTSTC3FN
34A AQ BTSTC3FA
P/O U26 4069 9 8 BTSTC3FN
35C AU
P/O 11 U26 10 4069
TP4 R37 4700
P/O 13 12 U25 11 4011
AT 35B
U12 4724
CL A2 A1 A0 D E VDD VSS
Q7 Q6 Q5 Q4 Q3 Q2 Q1 Q0
BTERR7A 14 P/O U11 15 4049 BTERR7N P1-91
BTERR6A 7 P/O U17 6 4049 BTERR6N P1-87
BTERR5A 3 P/O U17 2 4049 BTERR5N P1-86
BTERR4A 5 P/O U17 4 4049 BTERR4N P1-34
BTERR3A 11 P/O U11 12 4049 BTERR3N P1-92
BTERR2A 9 P/O U11 10 4049 BTERR2N P1-35
BTERR1A 3 P/O U11 2 4049 BTERR1N P1-93
BTERR0A 5 P/O U11 4 4049 BTERR0N P1-39
P/O U13 4012 12 11 10 9 13
P/O U13 4012 2 5 4 3 1
AC AB 31A
P/O U6 4072 11 10 12 9 13
P/O 7 U11 6 4049 BTLTSUMN P1-42
BTFLTSUMA P1-41
BTERR15A P1-85
U18 4724
BTERR15A
BTERR11A 9 P/O U17 10 4049 BTERR11N P1-33
BTERR10A 11 P/O U17 12 4049 BTERR10N P1-32
BTERR9A 14 P/O U17 15 4049 BTERR9N P1-31
BTERR8A 3 P/O U23 2 4049 BTERR8N P1-30
P/O U19 4012 5 4 3 2 1
P/O 8 9 U25 10 4011
34A, 43B AN BTSTC2FA
AM BTSTC1FA
AL BTSTC0FA
35B AS BTDATA

EL1WL101

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 6 of 8)

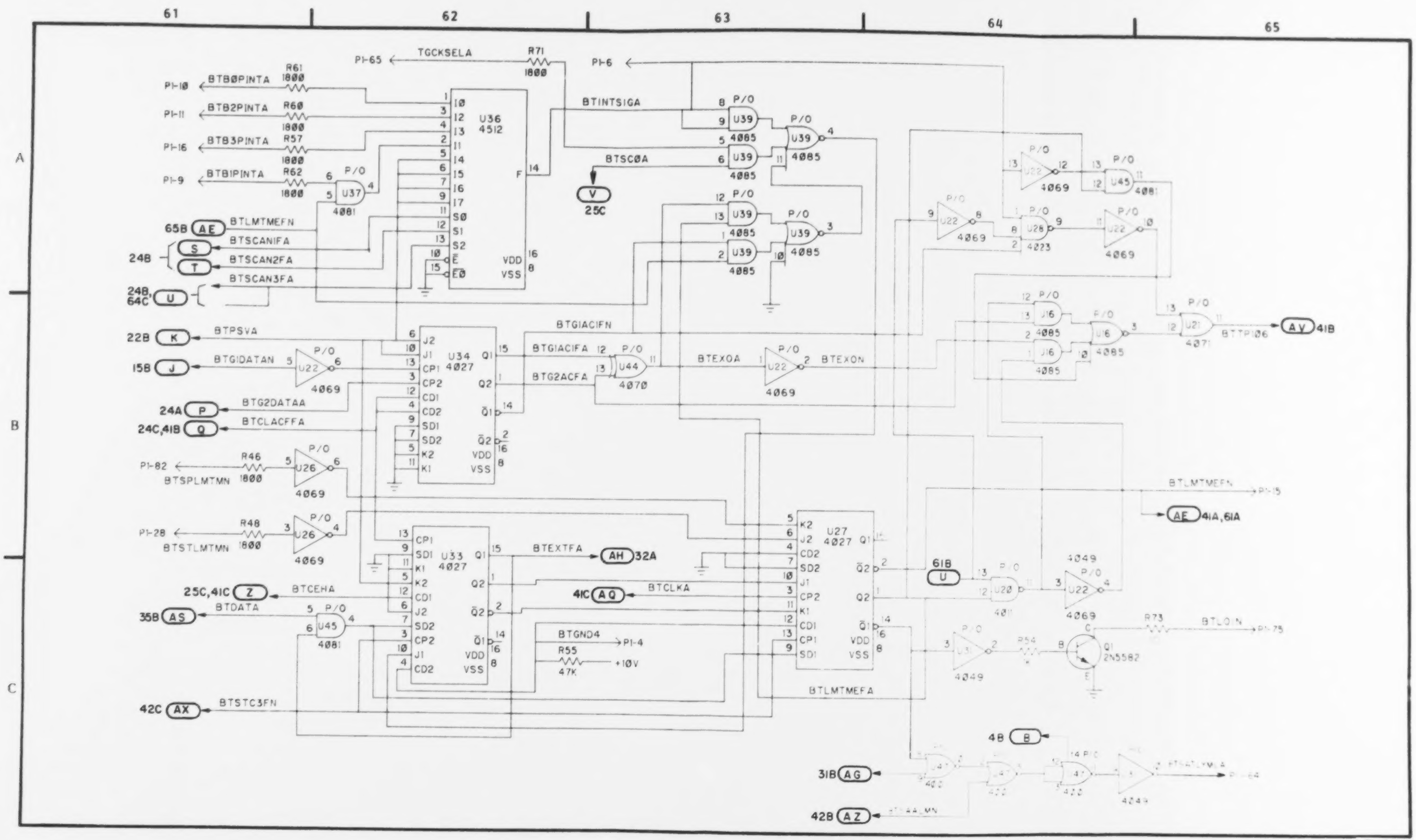
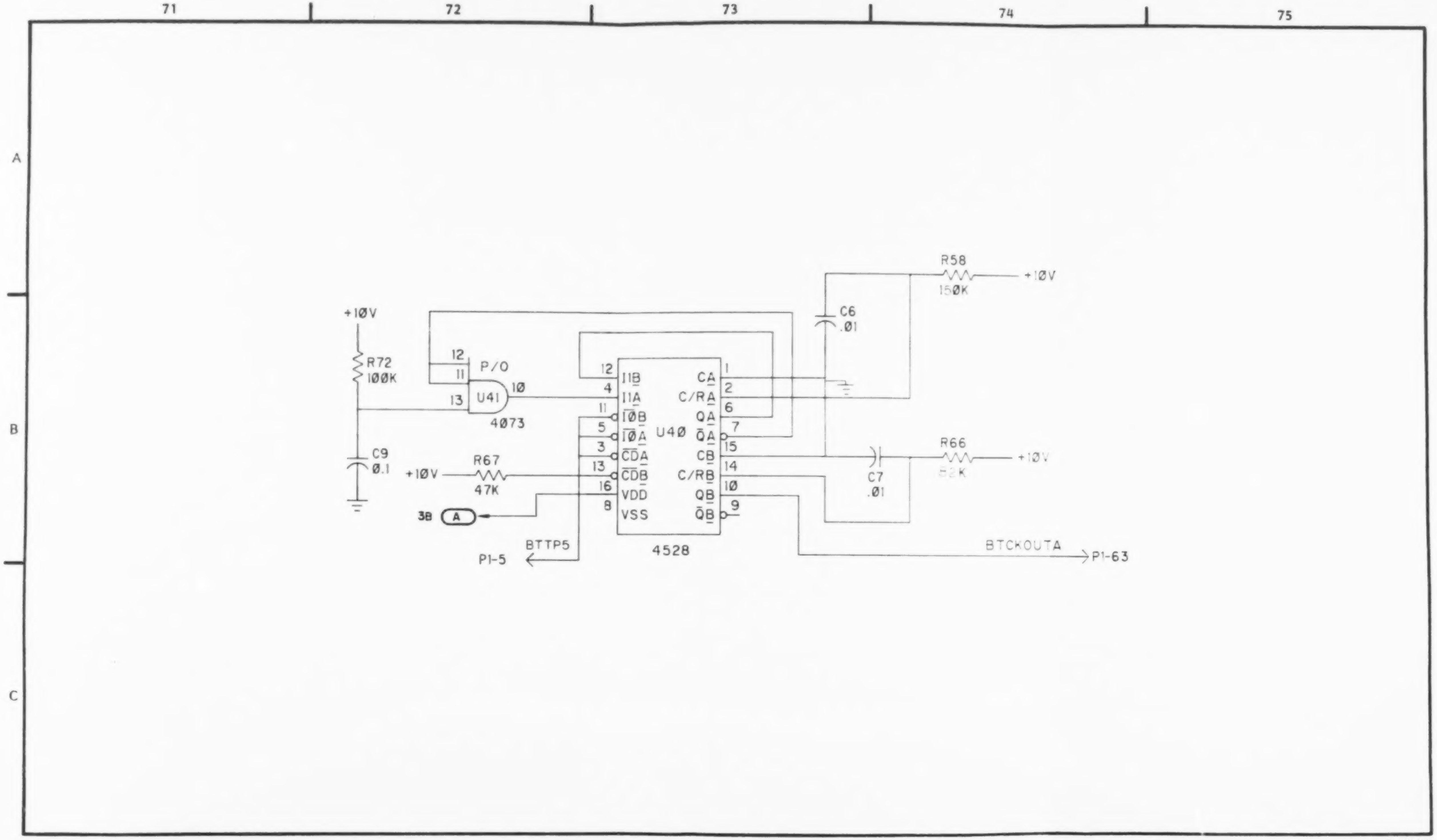
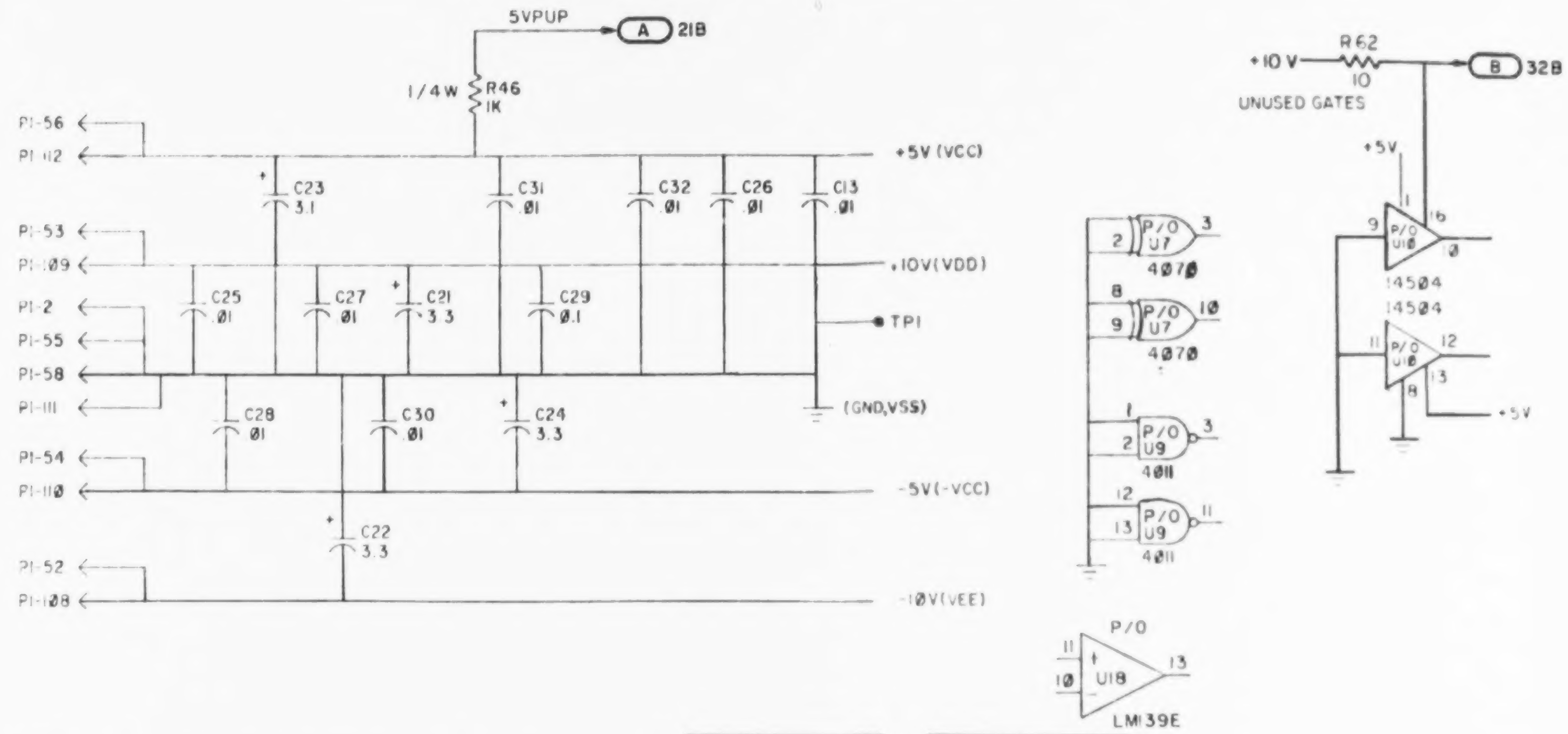

61
62
63
64
65
A
B
C
P1-65
TGCKSELA
R71
1800
P1-6
P1-10
BTB0PINTA
R61
1800
P1-11
BTB2PINTA
R60
1800
P1-16
BTB3PINTA
R57
1800
P1-9
BTB1PINTA
R62
1800
P/O
U37
4081
U36
4512
I0
I2
I3
I1
I4
I5
I6
I7
S0
S1
S2
Ē
Ē0
F
VDD
VSS
BTINTSIGA
BTSC0A
V
25C
U39
4085
65B
AE
BTLMTMEFN
S
BTSCAN1FA
24B
T
BTSCAN2FA
24B,
64C
U
BTSCAN3FA
22B
K
BTPSVA
15B
J
BTGIDATAN
U22
4069
24A
P
BTG2DATAA
24C,41B
Q
BTCLACFFA
P1-82
R46
1800
BTSPLMTMN
U26
4069
P1-28
R48
1800
BTSTLMTMN
U34
4027
J2
J1
CP1
CP2
CD1
CD2
SD1
SD2
K2
K1
Q1
Q2
Q̄1
Q̄2
BTGIACIFN
BTGIACIFA
BTG2ACFA
U44
4070
BTEXOA
BTEXON
U28
4023
U45
4081
U16
4085
U21
4071
BTTP106
AV
41B
BTLMTMEFN
P1-15
AE
41A,61A
U33
4027
BTEXTFA
AH
32A
25C,41C
Z
BTCEHA
41C
AQ
BTCLKA
35B
AS
BTDATA
BTGND4
P1-4
R55
47K
+10V
U27
4027
61B
U
U20
4081
4049
U22
4069
R73
BTLOIN
P1-75
U31
4049
R54
Q1
2N5582
B
C
E
BTLMTMEFA
42C
AX
BTSTC3FN
4B
B
31B
AG
U47
4001
BTSATLYMLA
P1-64
42B
AZ
EL1WL102

Figure FO-20. BITE 2 CCA A5 Schematic Diagram (Sheet 7 of 8)


71
72
73
74
75
A
B
C
+10V
R72
100K
C9
0.1
12
11
13
P/O
U41
10
4073
+10V
R67
47K
3B
A
BTTP5
P1-5
12
4
11
5
3
13
16
8
I1B
I1A
I0B
I0A
CDA
CDB
VDD
VSS
U40
4528
CA
C/RA
QA
QA
CB
C/RB
QB
QB
1
2
6
7
15
14
10
9
C6
.01
R58
150K
+10V
C7
.01
R66
82K
+10V
BTCKOUTA
P1-63

EL1WL103

Figure FO-20. BITE 2 CCA A5
Schematic Diagram
(Sheet 8 of 8)


1
2
3
4
5
A
B
C
5VPUP
A 21B
1/4W R46 1K
P1-56
P1-112
+5V (VCC)
C23 3.1
C31 .01
C32 .01
C26 .01
C13 .01
P1-53
P1-109
+10V(VDD)
C25 .01
C27 .01
C21 3.3
C29 0.1
P1-2
P1-55
TP1
P1-58
P1-111
(GND,VSS)
C28 .01
C30 .01
C24 3.3
P1-54
P1-110
-5V(-VCC)
C22 3.3
P1-52
P1-108
-10V(VEE)
+10 V
R62 10
B 32B
UNUSED GATES
+5V
P/O U7 4070
P/O U9 4011
P/O U10 14504
P/O U18 LM139E
+5V

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. UNLESS OTHERWISE SPECIFIED
   ALL RESISTANCE VALUES ARE IN OHMS,1/4 WATT,±2%.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3. THIS DIAGRAM CONFORMS TO ANSI Y32-14 1973 GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
4. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.
6. IC VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS:
   U5, U7, U9 AND U19 PIN 7 (VSS), PIN 14 (VDD)
   U18 PIN 3 (VCC), PIN 12 (-VCC).
   U13 AND U14 PIN 8 (VSS).

HIGHEST REFERENCE DESIGNATIONS		
CR8	C32	L2
P1	R62	S1
T2	U20	TP1

REF DES. NOT USED		
R28		

REV F

EL1WL104

Figure FO-21. Group Modem CCA A6,A12 Schematic Diagram (Sheet 1 of 4)

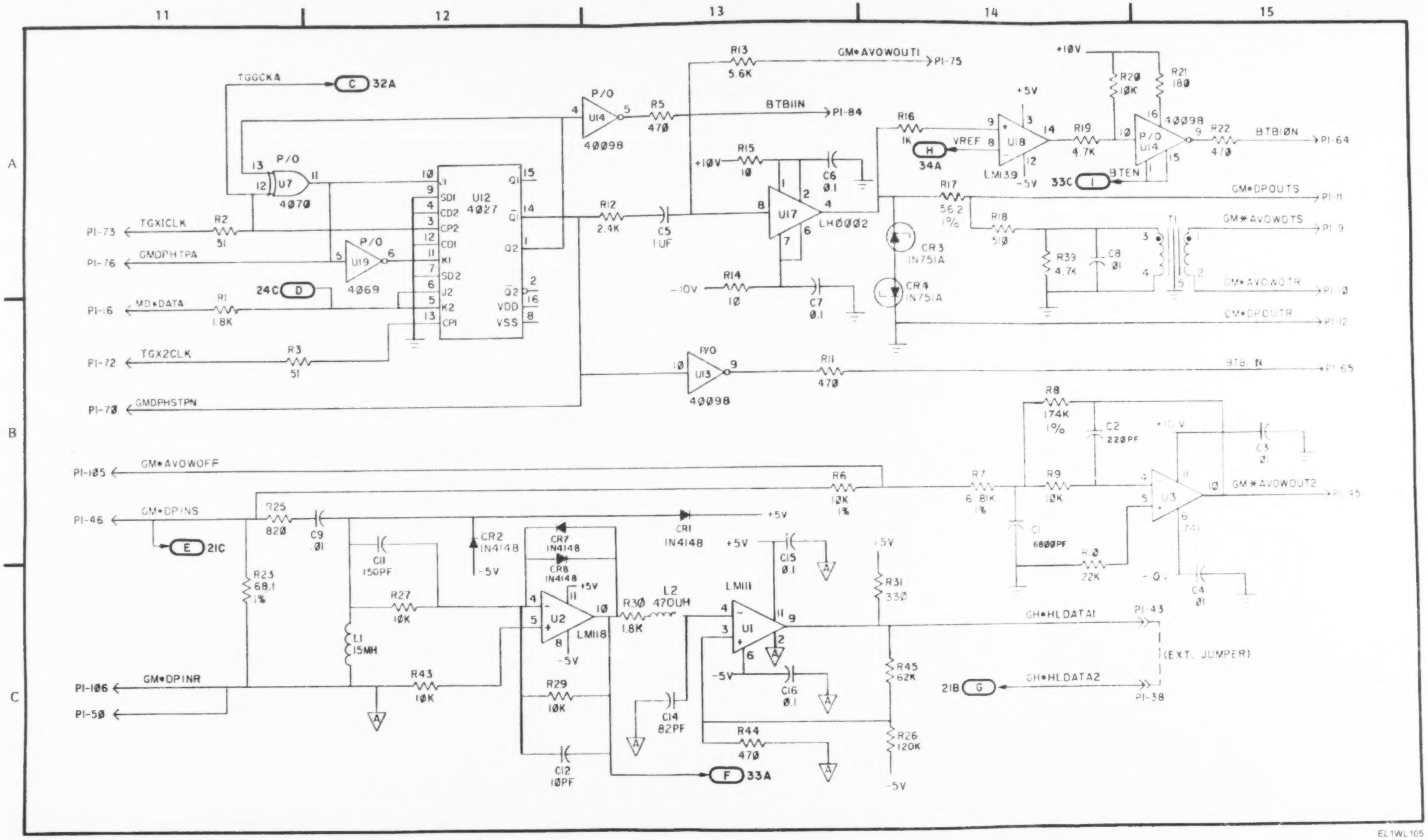
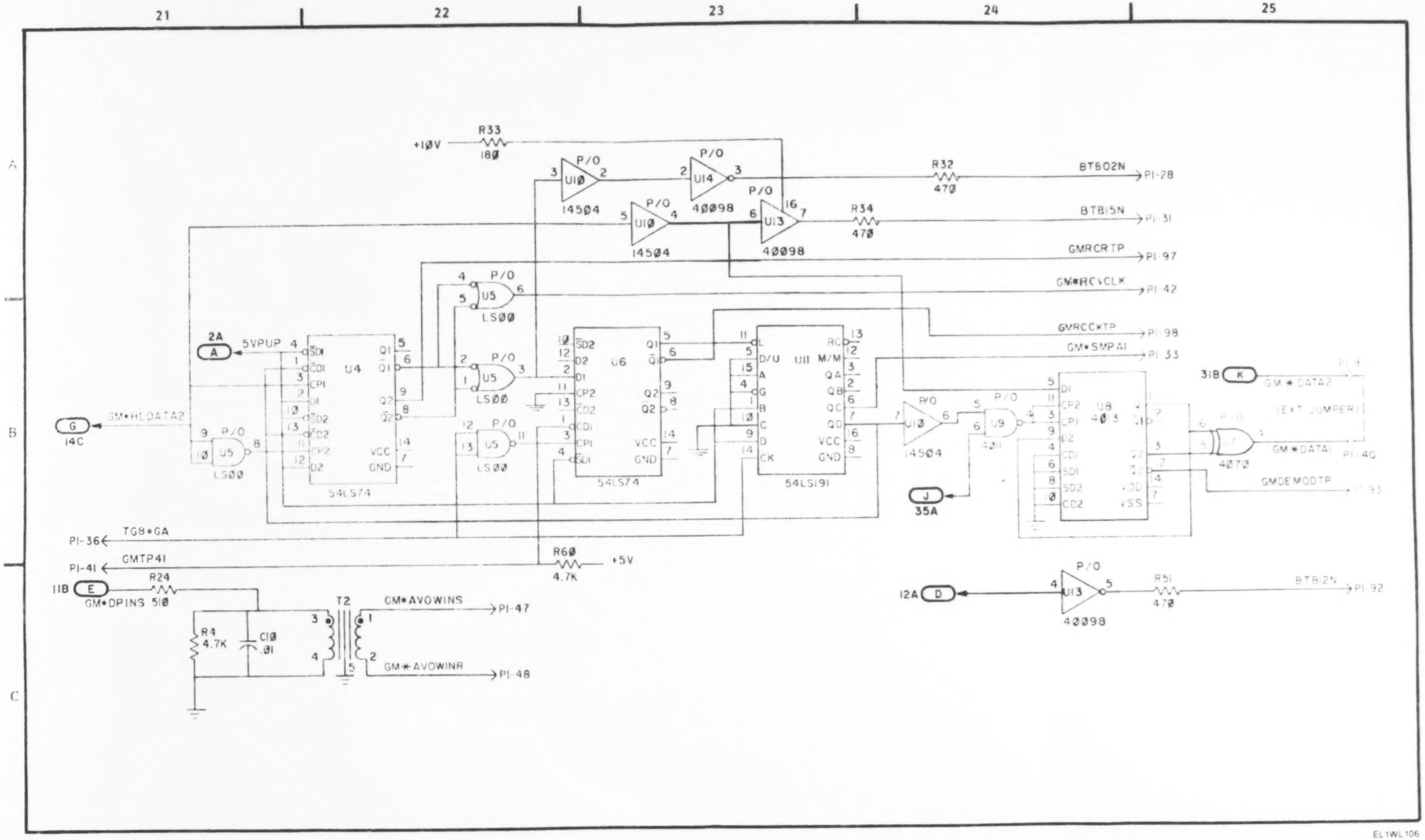
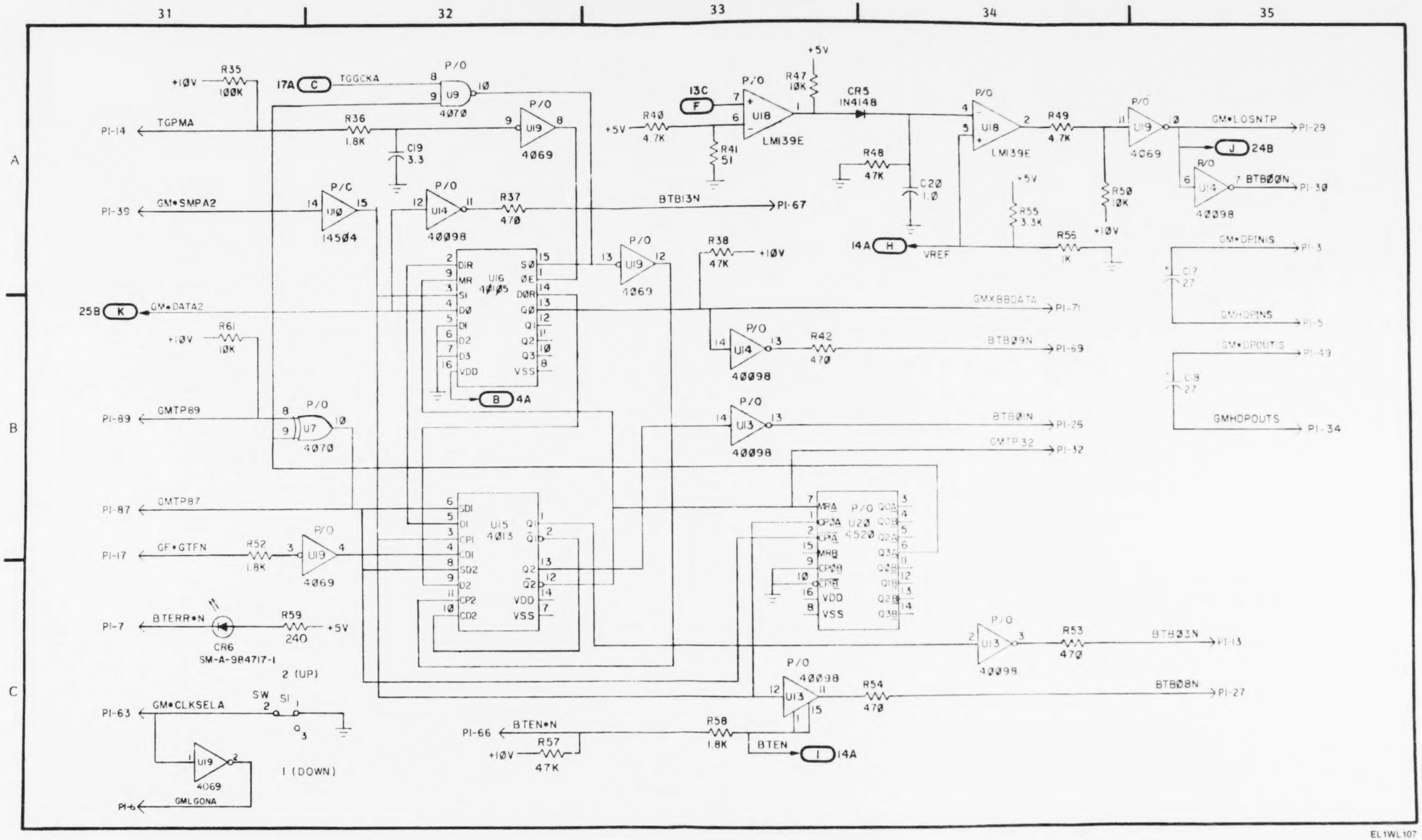

11
12
13
14
15
A
B
C
TGGCKA
C 32A
P/O
U14
40098
R5
470
BTBIIN
P1-84
R13
5.6K
GM•AVOWOUT1
P1-75
+10V
R20
10K
R21
180
+5V
R16
1K
H
34A
VREF
U18
LM139
-5V
R19
4.7K
P/O
U14
40098
R22
470
BTBI0N
P1-64
33C
I
BTEN
P/O
U7
4070
U12
4027
R15
10
C6
0.1
R12
2.4K
C5
1UF
U17
LH0002
R17
56.2
1%
GM•DPOUTS
P1-11
R18
510
T1
GM*AVOWOTS
P1-9
CR3
1N751A
CR4
1N751A
R39
4.7K
C8
.01
GM•AVOWOTR
P1-10
GM•DPOUTR
P1-12
P1-73
TGX1CLK
R2
51
P1-76
GMDPHTPA
P/O
U19
4069
P1-16
MD•DATA
R1
1.8K
24C
D
P1-72
TGX2CLK
R3
51
R14
10
-10V
C7
0.1
P/O
U13
40098
R11
470
BTB1 N
P1-65
P1-70
GMDPHSTPN
R8
174K
1%
C2
220PF
+10V
C3
.01
P1-105
GM•AVOWOFF
R6
10K
1%
R7
6.81K
1%
R9
10K
U3
741
GM*AVOWOUT2
P1-45
P1-46
GM•DPINS
R25
820
C9
.01
CR2
1N4148
CR1
1N4148
+5V
C1
6800PF
R10
22K
-10V
C4
.01
E
21C
C11
150PF
CR7
1N4148
CR8
1N4148
-5V
R23
68.1
1%
R27
10K
U2
LM118
R30
1.8K
L2
470UH
LM111
U1
C15
0.1
R31
330
GH•HLDATA1
P1-43
(EXT. JUMPER)
L1
15MH
R43
10K
R45
62K
21B
G
GH•HLDATA2
P1-38
P1-106
GM•DPINR
P1-50
R29
10K
C14
82PF
C16
0.1
R44
470
R26
120K
C12
10PF
F
33A
EL1WL105

Figure FO-21. Group Modem CCA A6,A12 Schematic Diagram (Sheet 2 of 4)


21
22
23
24
25
A
B
C
+10V
R33
180
P/O
U10
14504
U14
40098
U13
R32
470
BT802N
PI-28
R34
470
BTB15N
PI-31
GMRCRTP
PI-97
GM*RCVCLK
PI-42
GMRCCKTP
PI-98
GM*SMPA1
PI-33
2A
A
5VPUP
U4
54LS74
U5
LS00
U6
54LS74
U11
54LS191
G
14C
GM*HLDATA2
U9
4011
U8
4013
31B
K
GM*DATA2
PI-8
(EXT JUMPER)
4070
GM*DATA1
PI-40
GMDEMODTP
PI-93
J
35A
TG8*GA
PI-36
GMTP41
PI-41
R60
4.7K
+5V
11B
E
GM*DPINS
R24
510
R4
4.7K
C10
.01
T2
GM*AVOWINS
PI-47
GM*AVOWINR
PI-48
12A
D
R51
470
BTB12N
PI-92

EL1WL106

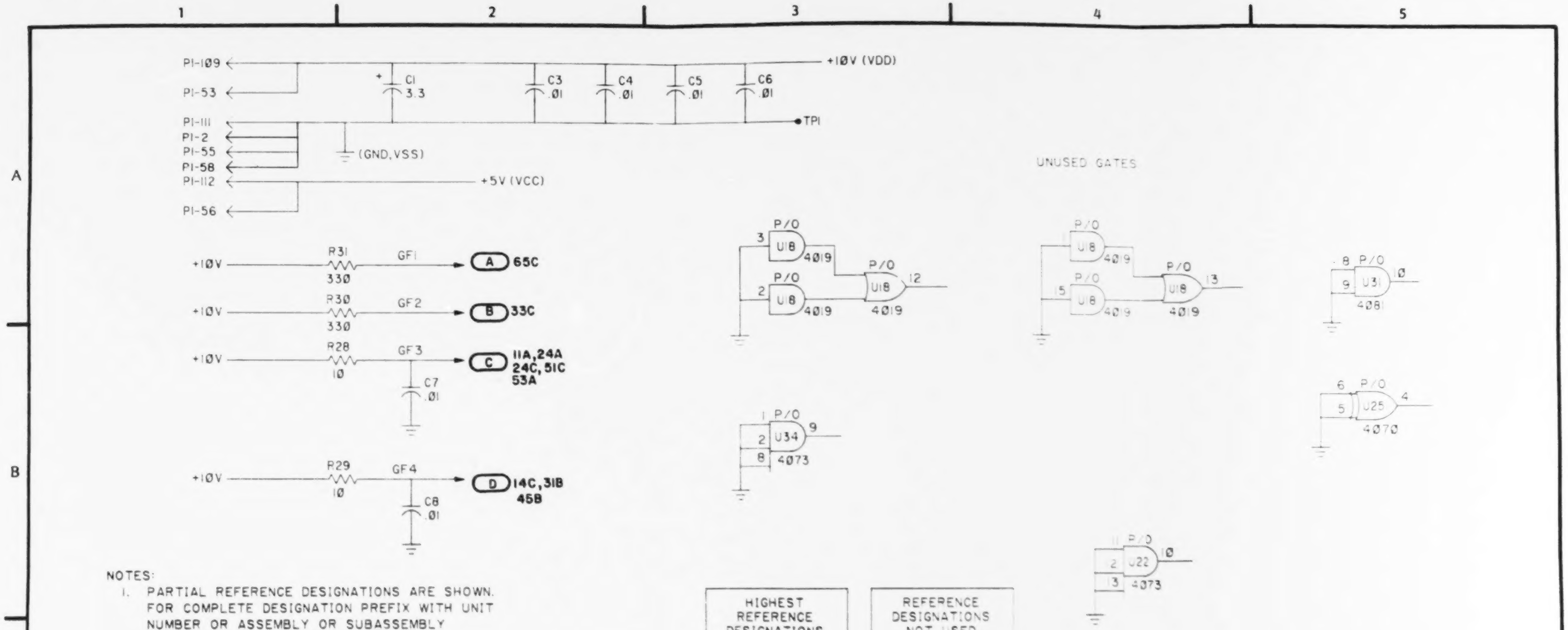
Figure FO-21. Group Modem CCA A6,A12 Schematic Diagram (Sheet 3 of 4)


31
32
33
34
35
A
B
C
+10V
R35
100K
17A
C
TGGCKA
8
9
P/O
U9
4070
10
PI-14
TGPMA
R36
1.8K
C19
3.3
U19
4069
PI-39
GM•SMPA2
P/C
U10
14504
14
15
12
U14
40098
11
R37
470
BTBI3N
PI-67
U16
40105
DIR
MR
SI
D0
D1
D2
D3
VDD
S0
ØE
D0R
Q0
Q1
Q2
Q3
VSS
B
4A
13C
F
+5V
R40
4.7K
R41
51
U18
LM139E
R47
10K
CR5
IN4148
R48
47K
C20
1.0
R38
47K
U18
LM139E
R49
4.7K
R50
10K
+5V
R55
3.3K
R56
1K
14A
H
VREF
U19
4069
GM•LOSNTP
PI-29
J
24B
U14
40098
BTB00N
PI-30
GM•DPINIS
PI-3
C17
27
GMHDPINS
PI-5
GM•DPOUTIS
PI-49
C18
27
GMHDPOUTS
PI-34
25B
K
GM•DATA2
R61
10K
GMXBBDATA
PI-71
U14
40098
R42
470
BTB09N
PI-69
PI-89
GMTP89
U7
4070
U13
40098
BTB01N
PI-26
GMTP32
PI-32
PI-87
GMTP87
U15
4013
SD1
D1
CP1
CD1
SD2
D2
CP2
CD2
Q1
Q̄1
Q2
Q̄2
VDD
VSS
U20
4520
MRA
CP0A
CPA
MRB
CP0B
CP1B
VDD
VSS
Q0A
Q0B
Q2A
Q3A
Q1B
Q2B
Q3B
PI-17
GF•GTFN
R52
1.8K
U19
4069
PI-7
BTERR•N
CR6
SM-A-984717-1
R59
240
+5V
2 (UP)
U13
40098
R53
470
BTB03N
PI-13
R54
470
BTB08N
PI-27
PI-63
GM•CLKSELA
SW
S1
1 (DOWN)
U19
4069
PI-6
GMLGONA
PI-66
BTEN•N
R57
47K
R58
1.8K
BTEN
I
14A

EL1WL107

Figure FO-21. Group Modem CCA A6,A12 Schematic Diagram (Sheet 4 of 4)

best copy available


1
2
3
4
5
A
B
C
P1-109
P1-53
P1-111
P1-2
P1-55
P1-58
P1-112
P1-56
+
C1
3.3
C3
.01
C4
.01
C5
.01
C6
.01
+10V (VDD)
TP1
(GND, VSS)
+5V (VCC)
+10V
R31
330
GF1
A
65C
+10V
R30
330
GF2
B
33C
+10V
R28
10
GF3
C7
.01
C
11A, 24A
24C, 51C
53A
+10V
R29
10
GF4
C8
.01
D
14C, 31B
45B
UNUSED GATES
P/O
U18
4019
3
2
12
13
11
15
P/O
U34
4073
1
2
8
9
P/O
U31
4081
8
9
10
P/O
U25
4070
6
5
4
P/O
U22
4073
11
2
13
10

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. ● DENOTES TEST POINT.
3. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT ±2%.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
4. THIS DIAGRAM CONFORMS TO ANSI Y32.14-1973, GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
5. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.
6. IC VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS: U3,U31,U25,U22,U34,U21,U26,U16,U19,U23,U15,U10,U20, U42,U17,U11,U36,U24,U30 AND U28 PIN 7 (VSS). U31,U25,U22,U34,U21, U26,U16,U15,U10,U20,U42, AND U11 PIN 14 (VDD). U18,U41 AND U47 PIN 8 (VSS). U18 PIN 16 (VDD). U7 PIN 8 (VSS), PIN 1 (VDD).

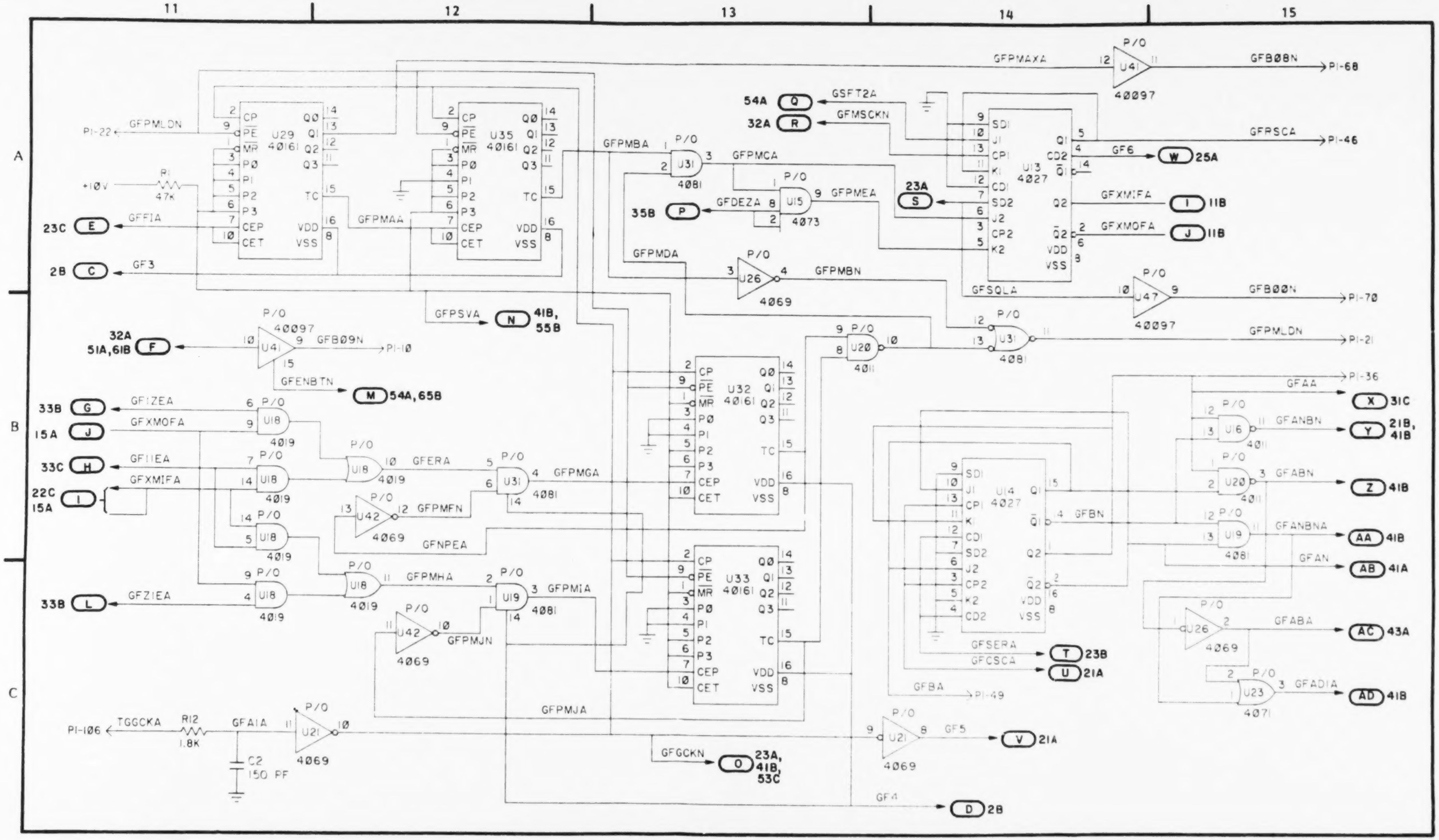
HIGHEST REFERENCE DESIGNATIONS		
CR2	TP4	C8
P1	R32	U49

REFERENCE DESIGNATIONS NOT USED		
R14	R15	R16
R21	R27	

REV G

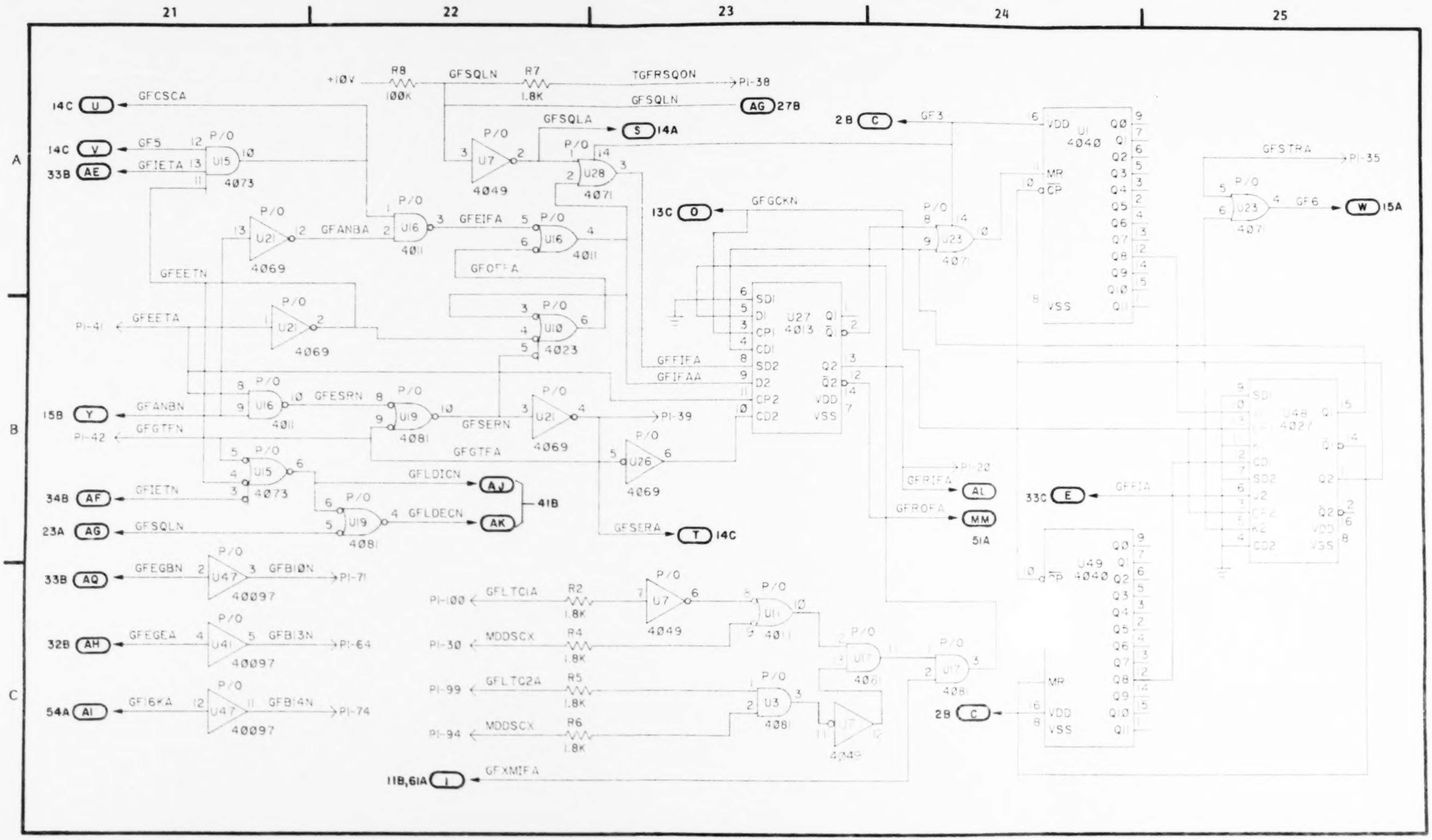
EL1WL108

Figure FO-22. Group Framing CCA A7,A14 Schematic Diagram (Sheet 1 of 7)


11
12
13
14
15
A
B
C
GFPMAXA
P/O
U41
40097
GFB08N
P1-68
54A Q GSFT2A
32A R GFMSCKN
U29 40161
U35 40161
CP
PE
MR
P0
P1
P2
P3
CEP
CET
Q0
Q1
Q2
Q3
TC
VDD
VSS
P1-22 GFPMLDN
+10V
R1 47K
23C E GFFIA
2B C GF3
GFPMAA
GFPMBA
U31 4081
GFPMCA
U15 4073
GFPMEA
35B P GFDEZA
23A S
U13 4027
SD1
J1
CP1
K1
CD1
SD2
J2
CP2
K2
CD2
GFRSCA
P1-46
GF6
W 25A
GFXMIFA
I 11B
GFXMOFA
J 11B
GFPMDA
U26 4069
GFPMBN
GFSQLA
U47 40097
GFB00N
P1-70
GFPSVA
N 41B, 55B
32A 51A,61B F
U41 40097
GFB09N
P1-10
GFENBTN
M 54A,65B
U20 4011
U31 4081
GFPMLDN
P1-21
U32 40161
U33 40161
P1-36
GFAA
X 31C
33B G GFIZEA
15A J GFXMOFA
U18 4019
GFERA
U31 4081
GFPMGA
33C H GFIIEA
22C 15A I GFXMIFA
U42 4069
GFPMFN
GFNPEA
U16 4011
GFANBN
Y 21B, 41B
U20 4011
GFABN
Z 41B
U14 4027
GFBN
U19 4081
GFANBNA
AA 41B
GFAN
AB 41A
GFPMHA
U19 4081
GFPMIA
33B L GFZIEA
U42 4069
GFPMJN
U26 4069
GFABA
AC 43A
GFSERA
T 23B
GFCSCA
U 21A
U23 4071
GFADIA
AD 41B
GFBA
P1-49
GFPMJA
P1-106 TGGCKA
R12 1.8K
GFA1A
C2 150 PF
U21 4069
U21 4069
GF5
V 21A
GFGCKN
O 23A, 41B, 53C
GF4
D 2B

EL1WL109

Figure FO-22. Group Framing CCA A7,A14 Schematic Diagram (Sheet 2 of 7)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A
B
C
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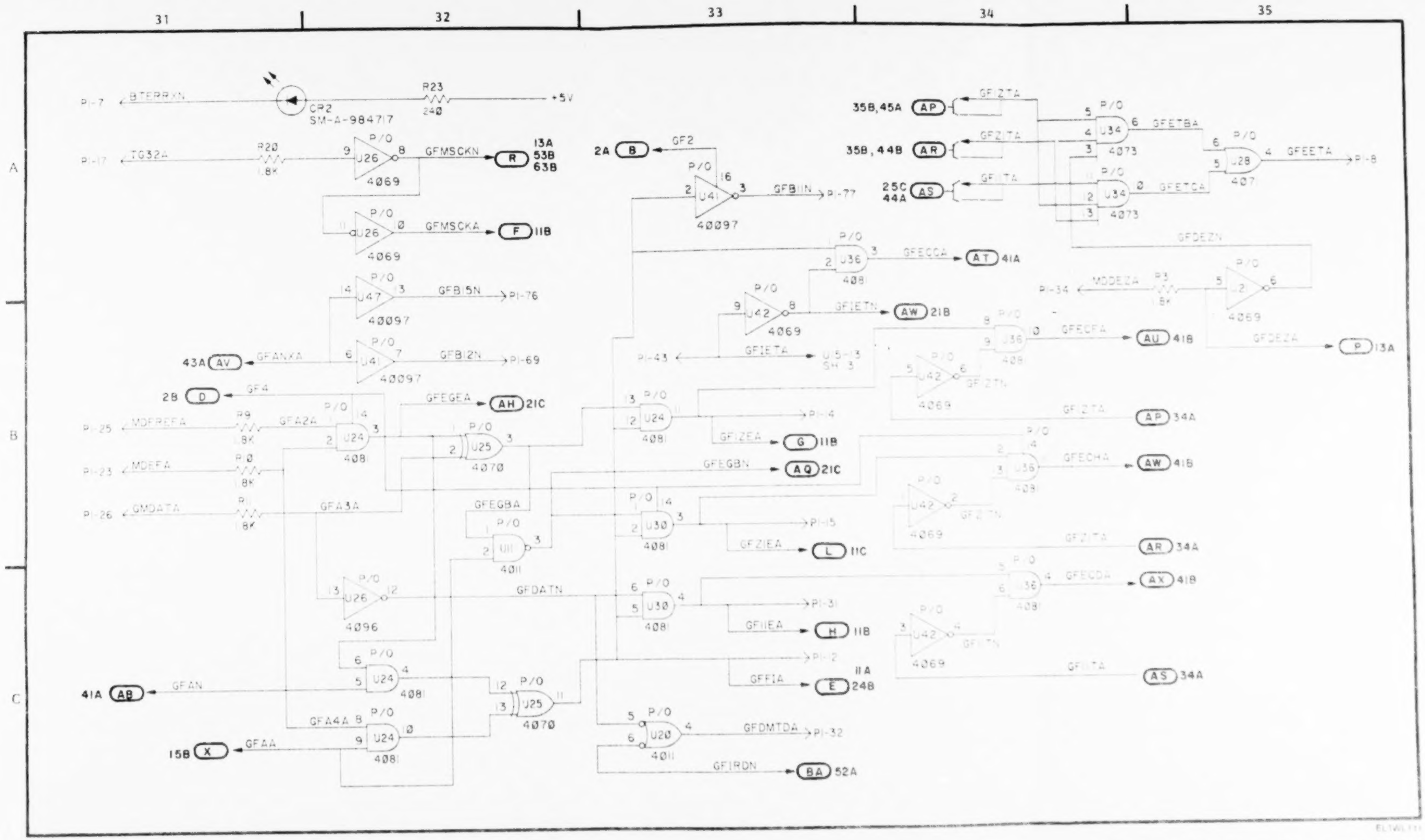
R8
100K
GFSQLN
R7
1.8K
TGFRSQON
P1-38
GFSQLN
AG 27B
14C U
GFCSCA
GFSQLA
S 14A
2B C
GF3
14C V
GF5
33B AE
GFIETA
U15
4073
U7
4049
U28
4071
U1
4040
VDD
MR
CP
VSS
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
GFSTRA
P1-35
U23
4071
GF6
W 15A
13C O
GFGCKN
U21
4069
GFANBA
U16
4011
GFEIFA
GFOFFA
GFEETN
P1-41
GFEETA
U10
4023
U27
4013
SD1
D1
CP1
CD1
SD2
D2
CP2
CD2
GFFIFA
GFIFAA
U48
4027
J2
K2
15B Y
GFANBN
GFESRN
U19
4081
GFSERN
P1-39
P1-42
GFGTFN
GFGTFA
U26
4069
P1-20
GFRIFA
AL
GFROFA
MM
51A
33C E
GFFIA
34B AF
GFIETN
GFLDICN
AJ
41B
23A AG
GFSQLN
GFLDECN
AK
GFSERA
T 14C
U49
4040
33B AQ
GFEGBN
U47
40097
GFB10N
P1-71
P1-100
GFLTC1A
R2
1.8K
U11
4011
U17
4081
32B AH
GFEGEA
U41
40097
GFB13N
P1-64
P1-30
MDDSCX
R4
1.8K
P1-99
GFLTC2A
R5
1.8K
U3
4081
2B C
54A AI
GF16KA
GFB14N
P1-74
P1-94
MDDSCX
R6
1.8K
11B,61A I
GFXMIFA
P/O

EL1WL110

Figure FO-22. Group Framing CCA A7,A14
Schematic Diagram
(Sheet 3 of 7)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32
33
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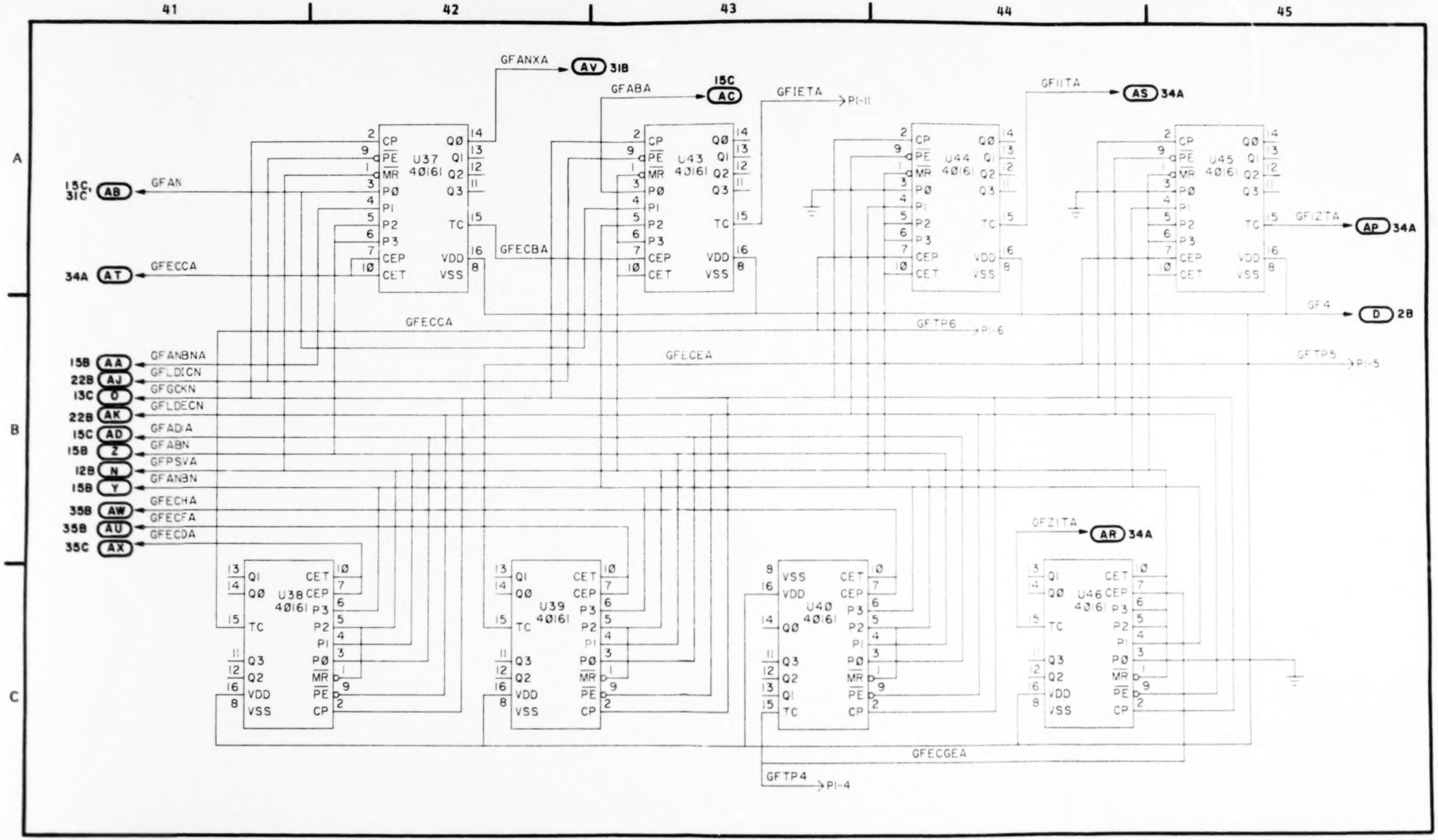
35
A
B
C
P1-7
BTERRXN
CR2
SM-A-984717
R23
240
+5V
P1-17
TG32A
R20
1.8K
P/O
U26
4069
GFMSCKN
R
13A
53B
63B
GFMSCKA
F
11B
U47
40097
GFB15N
P1-76
43A
AV
GFANXA
U41
GFB12N
P1-69
2B
D
GF4
P1-25
MDFREFA
R9
GFA2A
U24
4081
GFEGEA
AH
21C
U25
4070
P1-23
MDEFA
R10
P1-26
GMDATA
R11
GFA3A
GFEGBA
U11
4011
GFDATN
4096
41A
AB
GFAN
GFA4A
15B
X
GFAA
2A
B
GF2
GFB11N
P1-77
40097
U36
GFECCA
AT
41A
U42
GFIETN
AW
21B
P1-43
GFIETA
U15-13
SH 3
U24
P1-4
GFIZEA
G
11B
GFEGBN
AQ
21C
U30
P1-15
GFZIEA
L
11C
P1-31
GFIIEA
H
11B
P1-2
GFFIA
E
11A
24B
U20
GFDMTDA
P1-32
GFIRDN
BA
52A
35B,45A
AP
GFIZTA
35B,44B
AR
GFZITA
25C
44A
AS
GFIITA
U34
4073
GFETBA
GFETCA
U28
4071
GFEETA
P1-8
GFDEZN
P1-34
MODEZA
R3
1.8K
U2
4069
GFDEZA
P
13A
GFECFA
AU
41B
GFIZTN
GFIZTA
AP
34A
GFECHA
AW
41B
GFZITN
GFZITA
AR
34A
GFECDA
AX
41B
GFIITN
GFIITA
AS
34A

Figure FO-22. Group Framing CCA A7,A14
Schematic Diagram
(Sheet 4 of 7)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42
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44
45
A
B
C
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AV 31B
15C
AC
GFABA
GFIETA
PI-11
GFIITA
AS 34A
U37 40161
U43 40161
U44 40161
U45 40161
CP
PE
MR
P0
P1
P2
P3
CEP
CET
Q0
Q1
Q2
Q3
TC
VDD
VSS
15C, 31C AB
GFAN
34A AT
GFECCA
GFECBA
GFIZTA
AP 34A
GF4
D 2B
GFECCA
GFTP6
PI-6
GFECEA
GFTP5
PI-5
15B AA GFANBNA
22B AJ GFLDICN
13C O GFGCKN
22B AK GFLDECN
15C AD GFADIA
15B Z GFABN
12B N GFPSVA
15B Y GFANBN
35B AW GFECHA
35B AU GFECFA
35C AX GFECDA
GFZITA
AR 34A
U38 40161
U39 40161
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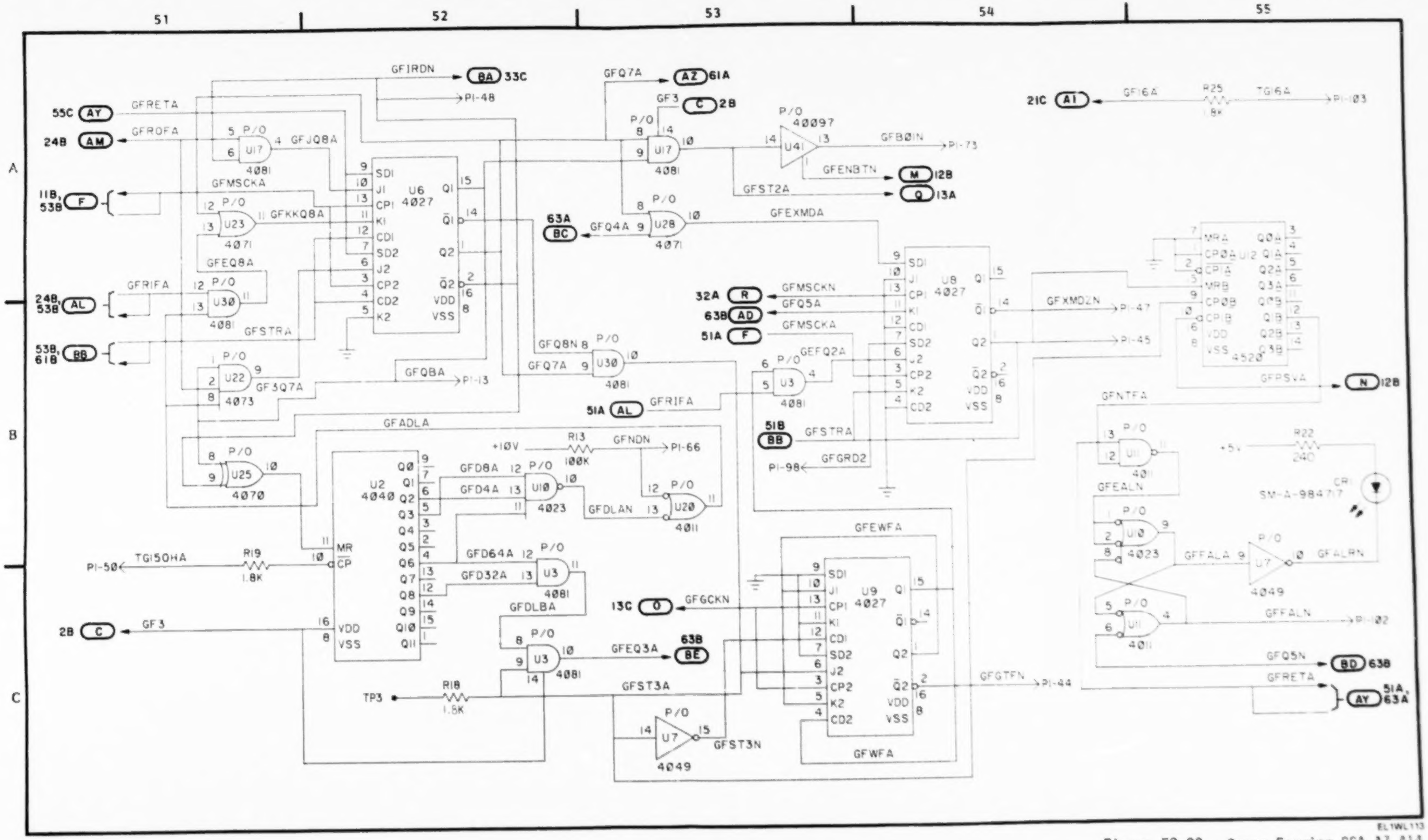
GFTP4
PI-4
EL1WL112

Figure FO-22. Group Framing CCA A7,A14 Schematic Diagram (Sheet 5 of 7)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53
54
55
A
B
C
GFIRDN
BA 33C
PI-48
GFQ7A
AZ 61A
GF3
C 2B
P/O
40097
U41
GFBØIN
PI-73
GFENBTN
M 12B
GFST2A
Q 13A
21C
A1
GF16A
R25
1.8K
TG16A
PI-03
55C
AY
GFRETA
24B
AM
GFROFA
P/O
U17
4081
GFJQ8A
GFMSCKA
11B, 53B
F
U23
4071
GFKKQ8A
U6
4027
SDI
J1
CP1
K1
CD1
SD2
J2
CP2
CD2
K2
Q1
Q2
VDD
VSS
GFEQ8A
GFRIFA
24B, 53B
AL
U30
4081
GFSTRA
53B, 61B
BB
U22
4073
GF3Q7A
GFQBA
PI-13
GFQ8N
GFQ4A
63A
BC
U28
4071
GFEXMDA
U8
4027
32A
R
GFMSCKN
GFQ5A
63B
AD
51A
F
GFEFQ2A
U3
GFXMD2N
PI-47
PI-45
U12
4520
MRA
CPØA
CP1A
MRB
CPØB
CP1B
QØA
Q1A
Q2A
Q3A
QØB
Q1B
Q2B
Q3B
GFPSVA
N 12B
51A
AL
GFRIFA
51B
BB
GFSTRA
GFGRD2
PI-98
GFADLA
U25
4070
U2
4040
QØ
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
MR
CP
+10V
R13
100K
GFNDN
PI-66
GFD8A
GFD4A
U10
4023
GFDLAN
U20
4011
GFNTFA
U11
4011
+5V
R22
240
CR1
SM-A-984717
GFEALN
U10
4023
GFFALA
U7
4049
GFALRN
GFEWFA
U9
4027
PI-50
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R19
1.8K
GFD64A
GFD32A
U3
4081
13C
O
GF6CKN
GFDLBA
GFFALN
PI-02
U11
4011
28
C
GF3
GFEQ3A
63B
BE
GFQ5N
BD 63B
GFGTFN
PI-44
GFRETA
51A, 63A
AY
TP3
R18
1.8K
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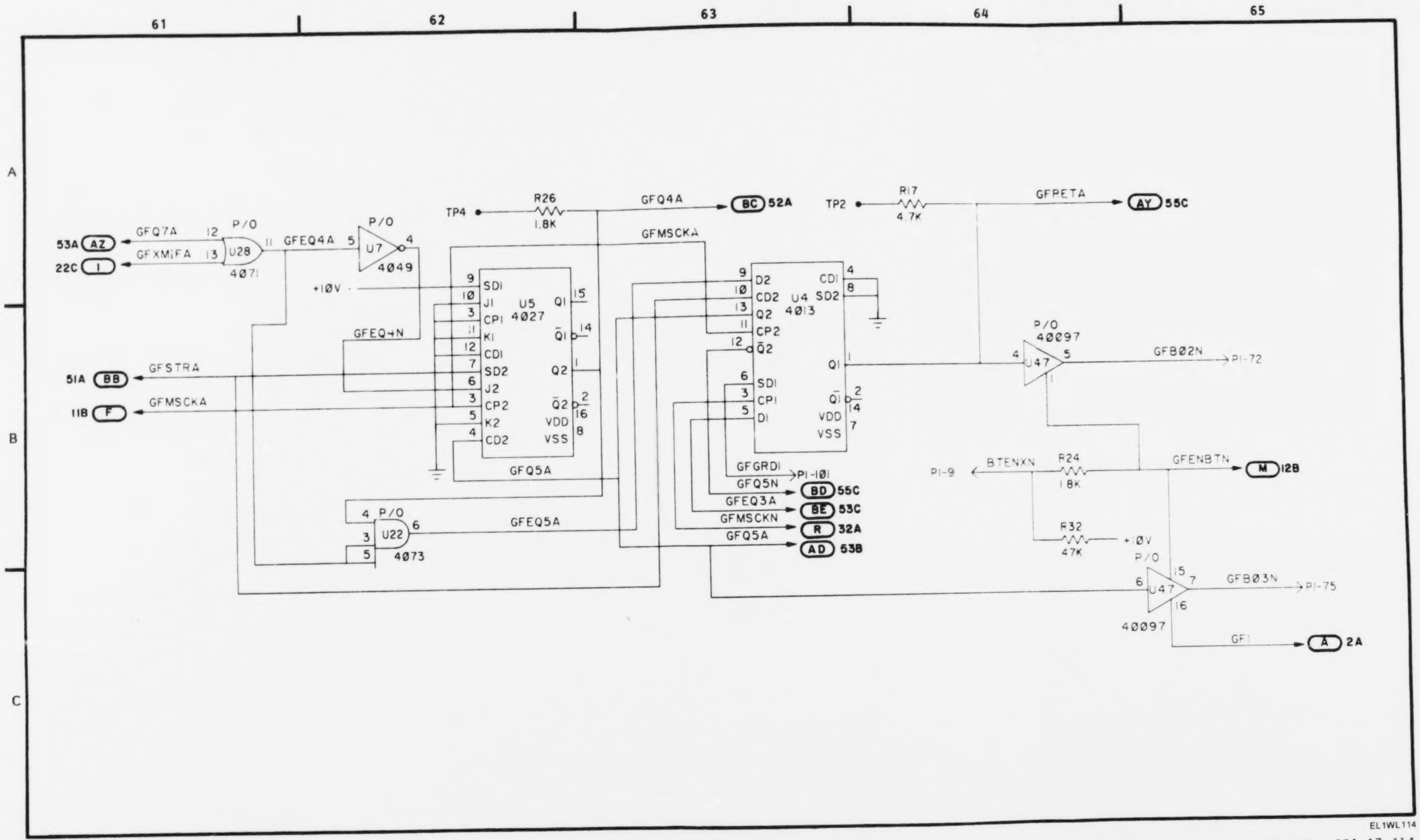
GFWFA

EL1WL113

Figure FO-22. Group Framing CCA A7,A14 Schematic Diagram (Sheet 6 of 7)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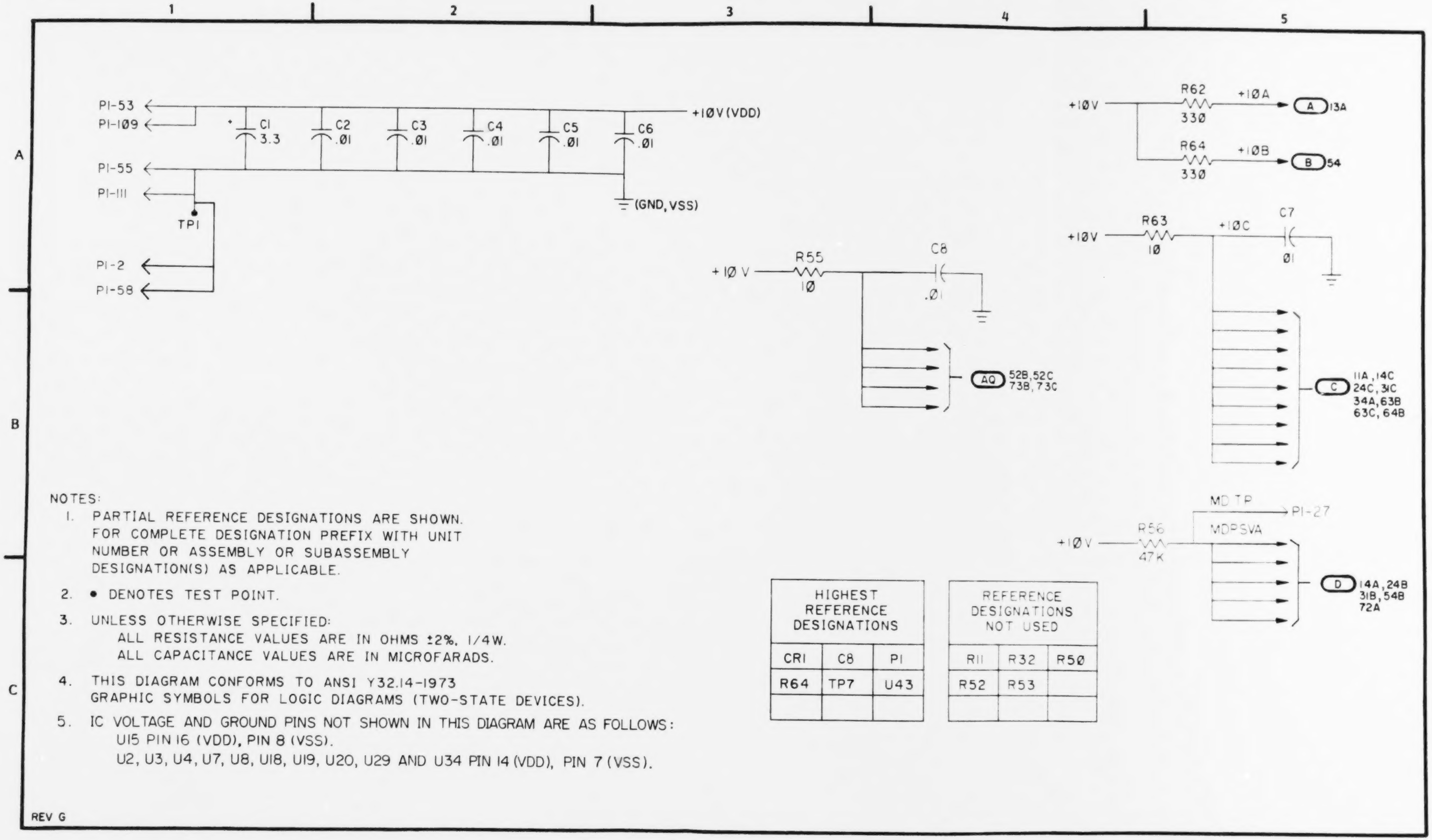
64
65
A
B
C
53A
AZ
GFQ7A
22C
I
GFXMIFA
12
13
P/O
U28
4071
11
GFEQ4A
5
P/O
U7
4049
4
TP4
R26
1.8K
GFQ4A
BC
52A
GFMSCKA
+10V
9
10
3
11
12
7
6
3
5
4
SDI
J1
CP1
K1
CD1
SD2
J2
CP2
K2
CD2
U5
4027
Q1
Q̄1
Q2
Q̄2
VDD
VSS
15
14
1
2
16
8
GFEQ4N
51A
BB
GFSTRA
11B
F
GFMSCKA
GFQ5A
4
3
5
P/O
U22
4073
6
GFEQ5A
D2
CD2
Q2
CP2
Q̄2
SDI
CP1
DI
CD1
SD2
U4
4013
Q1
Q̄1
VDD
VSS
9
10
13
11
12
6
3
5
4
8
1
2
14
7
GFGRDI
P1-101
GFQ5N
BD
55C
GFEQ3A
BE
53C
GFMSCKN
R
32A
GFQ5A
AD
53B
TP2
R17
4.7K
GFRETA
AY
55C
P/O
40097
4
U47
5
1
GFB02N
P1-72
P1-9
BTENXN
R24
1.8K
GFENBTN
M
12B
R32
47K
+10V
P/O
6
U47
15
7
16
40097
GFB03N
P1-75
GF1
A
2A
EL1WL114

Figure FO-22. Group Framing CCA A7,A14 Schematic Diagram (Sheet 7 of 7)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2
3
4
5
A
B
C
P1-53
P1-109
P1-55
P1-111
TP1
P1-2
P1-58
C1 3.3
C2 .01
C3 .01
C4 .01
C5 .01
C6 .01
+10V(VDD)
(GND,VSS)
+10V
R62 330
+10A
A 13A
R64 330
+10B
B 54
+10V
R63 10
+10C
C7 01
C 11A,14C 24C,31C 34A,63B 63C,64B
+10 V
R55 10
C8 .01
AQ 52B,52C 73B,73C
MD TP
P1-27
MDPSVA
+10V
R56 47K
D 14A,24B 31B,54B 72A
REV G

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. ● DENOTES TEST POINT.
3. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTANCE VALUES ARE IN OHMS ±2%, 1/4W.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
4. THIS DIAGRAM CONFORMS TO ANSI Y32.14-1973 GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
5. IC VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS:
   U15 PIN 16 (VDD), PIN 8 (VSS).
   U2, U3, U4, U7, U8, U18, U19, U20, U29 AND U34 PIN 14 (VDD), PIN 7 (VSS).

HIGHEST REFERENCE DESIGNATIONS		
CR1	C8	P1
R64	TP7	U43

REFERENCE DESIGNATIONS NOT USED		
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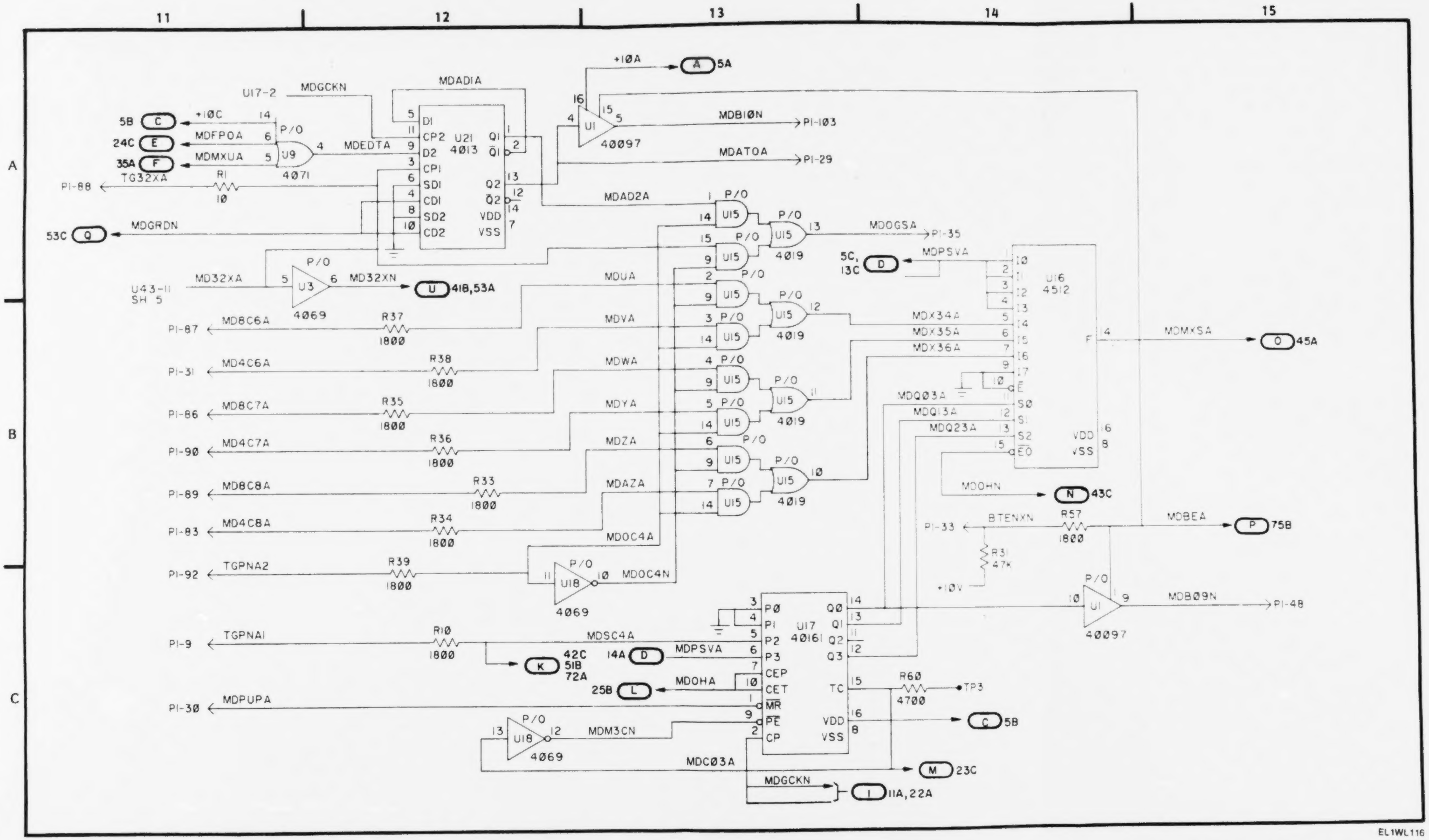
R52	R53	

EL1WL115

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 1 of 8)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B
C
+10A
A 5A
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MDGCKN
MDADIA
16
15
5
4
U1
40097
MDBI0N
PI-103
MDATOA
PI-29
5B C +10C 14
24C E MDFPOA 6
35A F MDMXUA 5
P/O
U9
4071
4
MDEDTA
DI
CP2
D2
CPI
SDI
CDI
SD2
CD2
U21
4013
QI
Q̄I
Q2
Q̄2
VDD
VSS
PI-88 TG32XA
RI
10
53C Q MDGRDN
MDAD2A
U15
4019
MDOGSA
PI-35
5C, 13C D MDPSVA
U16
4512
I0
I1
I2
I3
I4
I5
I6
I7
Ē
S0
S1
S2
ĒO
VDD
VSS
F
MDMXSA
O 45A
U43-11 SH 5
MD32XA
U3
4069
MD32XN
U 41B,53A
MDUA
PI-87 MD8C6A R37 1800
MDVA
MDX34A
MDX35A
MDX36A
PI-31 MD4C6A R38 1800
MDWA
MDQ03A
MDQ13A
MDQ23A
PI-86 MD8C7A R35 1800
MDYA
PI-90 MD4C7A R36 1800
MDZA
MDOHN
N 43C
PI-89 MD8C8A R33 1800
MDAZA
PI-83 MD4C8A R34 1800
MDOC4A
PI-33 BTENXN R57 1800
MDBEA
P 75B
R31 47K
+10V
PI-92 TGPNA2 R39 1800
U18
4069
MDOC4N
P0
P1
P2
P3
CEP
CET
MR
PE
CP
U17
40161
Q0
Q1
Q2
Q3
TC
VDD
VSS
U1
40097
MDB09N
PI-48
PI-9 TGPNAI R10 1800
MDSC4A
K 42C 51B 72A
14A D MDPSVA
25B L MDOHA
R60 4700
TP3
PI-30 MDPUPA
C 5B
13 U18 4069 12 MDM3CN
MDC03A
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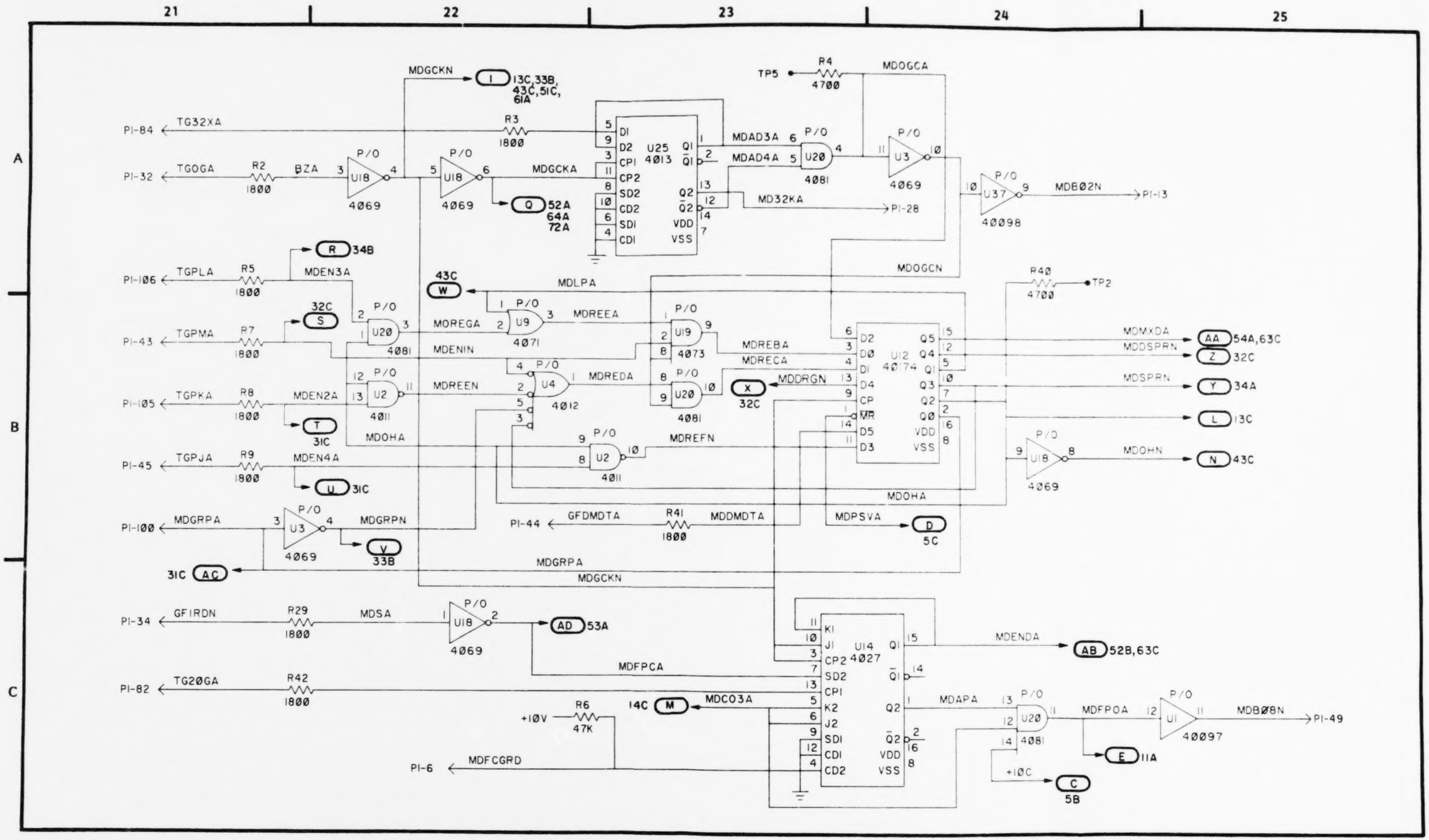
I 11A,22A
EL1WL116

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 2 of 8)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B
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P1-32
TGOGA
R2
1800
BZA
U18
4069
P/O
MDGCKN
13C,33B,
43C,51C,
61A
R3
1800
MDGCKA
Q
52A
64A
72A
U25
4013
D1
D2
CP1
CP2
SD2
CD2
SD1
CD1
Q1
Q2
VDD
VSS
TP5
R4
4700
MDOGCA
MDAD3A
MDAD4A
U20
4081
U3
4069
U37
40098
MDB02N
P1-13
MD32KA
P1-28
P1-106
TGPLA
R5
1800
MDEN3A
R
34B
43C
W
MDLPA
MDOGCN
R40
4700
TP2
P1-43
TGPMA
R7
1800
32C
S
MOREGA
U9
4071
MDREEA
U19
4073
MDENIN
MDREBA
MDRECA
U12
40174
D2
D0
D1
D4
CP
MR
D5
D3
Q5
Q4
Q1
Q3
Q2
Q0
VDD
VSS
MDMXDA
AA
54A,63C
MDDSPRN
Z
32C
MDSPRN
Y
34A
L
13C
P1-105
TGPKA
R8
1800
MDEN2A
U2
4011
MDREEN
U4
4012
MDREDA
MDDRGN
X
32C
T
31C
MDOHA
P1-45
TGPJA
R9
1800
MDEN4A
U
31C
MDREFN
MDOHN
N
43C
P1-100
MDGRPA
U3
4069
MDGRPN
V
33B
P1-44
GFDMDTA
R41
1800
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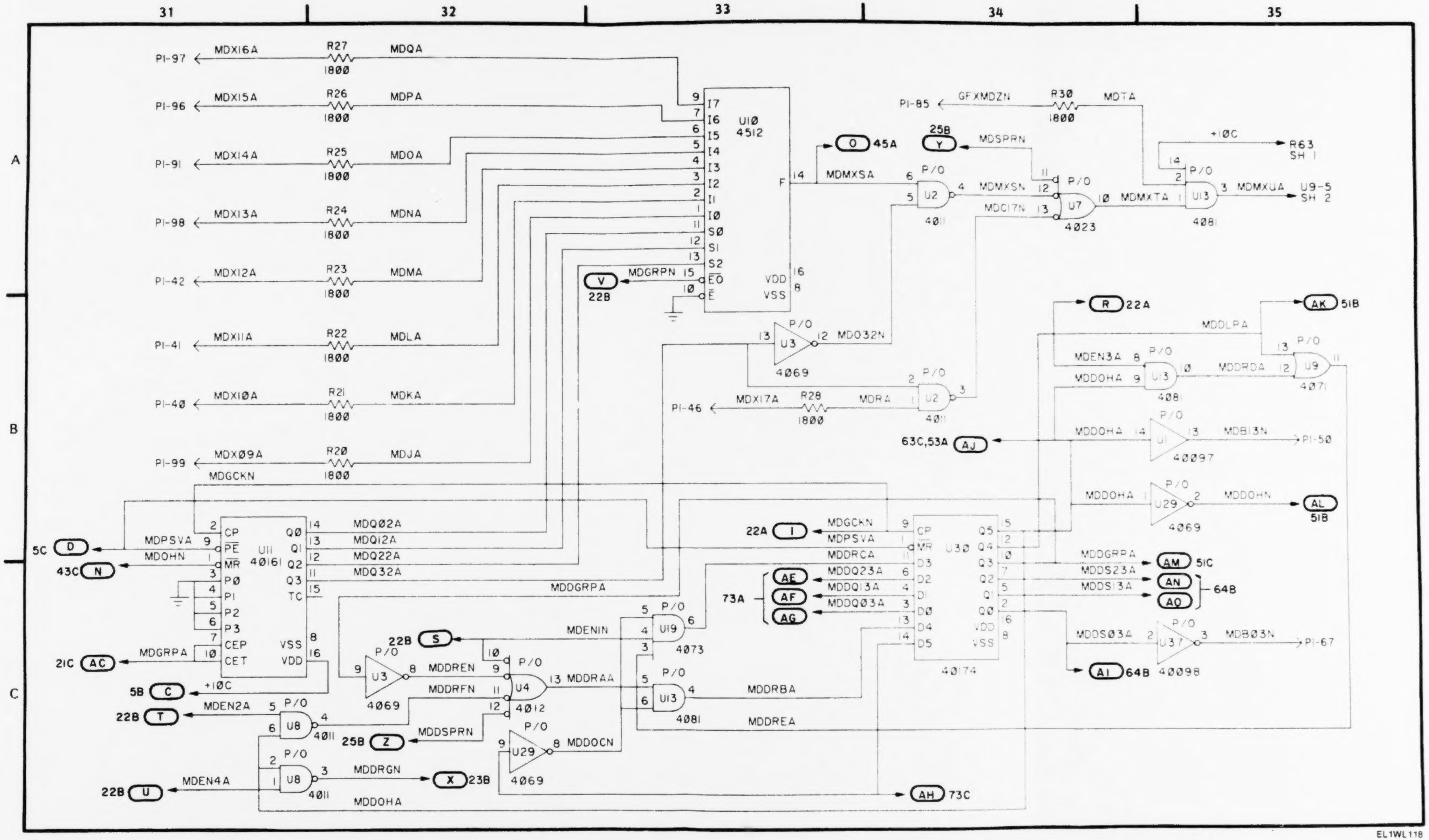
MDPSVA
D
5C
31C
AC
MDGRPA
MDGCKN
P1-34
GFIRDN
R29
1800
MDSA
U18
4069
AD
53A
MDFPCA
U14
4027
K1
J1
CP2
SD2
CP1
K2
J2
SD1
CD1
CD2
Q1
Q2
VDD
VSS
MDENDA
AB
52B,63C
P1-82
TG20GA
R42
1800
14C
M
MDCO3A
+10V
R6
47K
MDAPA
U20
4081
MDFPOA
U1
40097
MDB08N
P1-49
E
11A
+10C
C
5B
P1-6
MDFCGRD

EL1WL117

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 3 of 8)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34
35
A
B
C
PI-97
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R27
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MDQA
PI-96
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MDPA
PI-91
MDXI4A
R25
1800
MDOA
PI-98
MDXI3A
R24
1800
MDNA
PI-42
MDXI2A
R23
1800
MDMA
PI-41
MDXIIA
R22
1800
MDLA
PI-40
MDXI0A
R21
1800
MDKA
PI-99
MDX09A
R20
1800
MDJA
MDGCKN
U10
4512
I7
I6
I5
I4
I3
I2
I1
I0
S0
S1
S2
EO
E
VDD
VSS
F
MDGRPN
V
22B
O
45A
MDMXSA
PI-85
GFXMDZN
R30
1800
MDTA
25B
Y
MDSPRN
P/O
U2
4011
MDMXSN
U7
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R63
SH 1
U13
4081
MDMXUA
U9-5
SH 2
U3
4069
MDO32N
PI-46
MDXI7A
R28
1800
MDRA
R
22A
AK
51B
MDDLPA
MDEN3A
MDDOHA
MDDRDA
U9
4071
63C,53A
AJ
U1
40097
MDBI3N
PI-50
U29
4069
MDDOHN
AL
51B
5C
D
43C
N
MDPSVA
MDOHN
U11
40161
CP
PE
MR
P0
P1
P2
P3
CEP
CET
Q0
Q1
Q2
Q3
TC
VSS
VDD
MDQ02A
MDQI2A
MDQ22A
MDQ32A
MDDGRPA
21C
AC
MDGRPA
5B
C
+10C
22B
T
MDEN2A
U8
4011
22B
U
MDEN4A
MDDRGN
X
23B
MDDOHA
22B
S
MDENIN
U19
4073
MDDREN
MDDRFN
U4
4012
MDDRAA
25B
Z
MDDSPRN
MDDOCN
MDDRBA
MDDREA
22A
I
MDGCKN
MDPSVA
MDDRCA
73A
AE
AF
AG
MDDQ23A
MDDQI3A
MDDQ03A
U30
40174
D0
D1
D2
D3
D4
D5
Q0
Q1
Q2
Q3
Q4
Q5
MDDGRPA
AM
51C
MDDS23A
AN
MDDSI3A
AO
64B
MDDS03A
U37
40098
MDB03N
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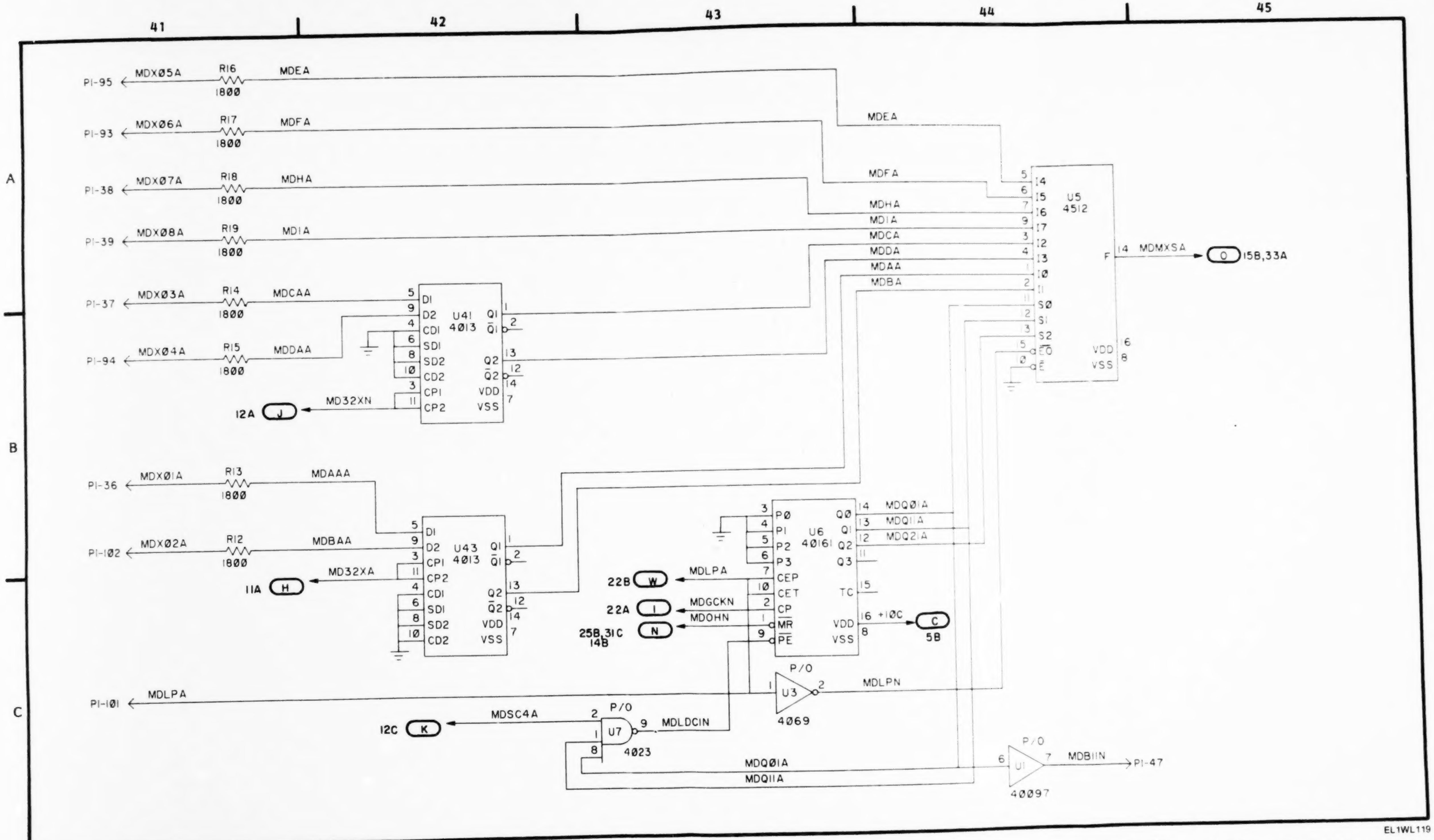
AI
64B
AH
73C
EL1WL118

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 4 of 8)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42
43
44
45
A
B
C
P1-95
MDX05A
R16
1800
MDEA
P1-93
MDX06A
R17
1800
MDFA
P1-38
MDX07A
R18
1800
MDHA
P1-39
MDX08A
R19
1800
MDIA
P1-37
MDX03A
R14
1800
MDCAA
P1-94
MDX04A
R15
1800
MDDAA
U41
4013
D1
D2
CD1
SD1
SD2
CD2
CP1
CP2
Q1
Q̄1
Q2
Q̄2
VDD
VSS
MD32XN
12A
J
U5
4512
I4
I5
I6
I7
I2
I3
I0
I1
S0
S1
S2
EO
Ē
VDD
VSS
F
MDEA
MDFA
MDHA
MDIA
MDCA
MDDA
MDAA
MDBA
MDMXSA
O
15B,33A
P1-36
MDX01A
R13
1800
MDAAA
P1-102
MDX02A
R12
1800
MDBAA
U43
4013
MD32XA
11A
H
U6
40161
P0
P1
P2
P3
CEP
CET
CP
MR
PE
Q0
Q1
Q2
Q3
TC
VDD
VSS
MDQ01A
MDQ11A
MDQ21A
MDLPA
22B
W
MDGCKN
22A
I
MDOHN
25B,31C
14B
N
+10C
C
5B
P/O
U3
4069
MDLPN
P1-101
MDLPA
MDSC4A
12C
K
P/O
U7
4023
MDLDCIN
MDQ01A
MDQ11A
P/O
U1
40097
MDB11N
P1-47
EL1WL119

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 5 of 8)

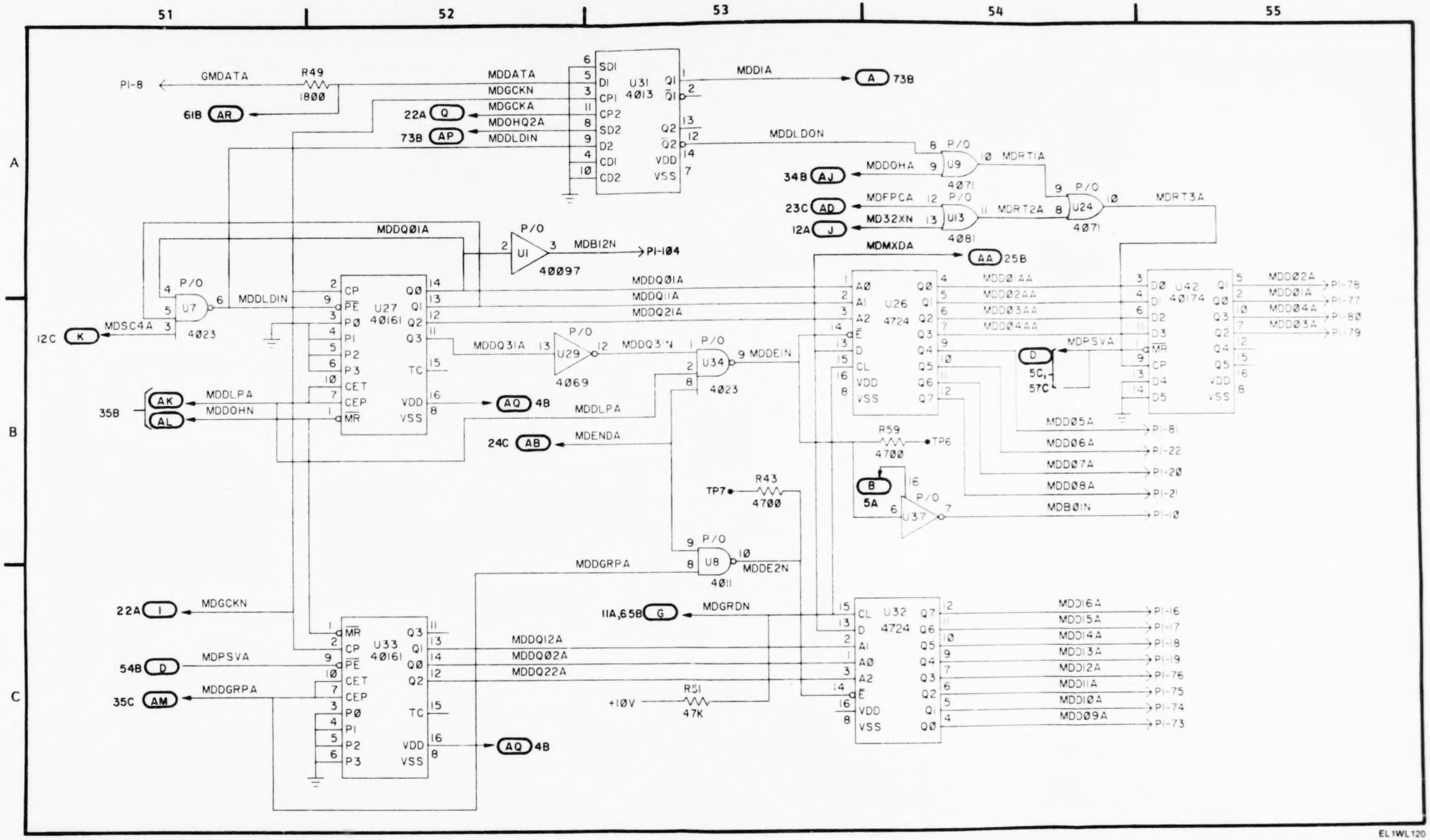

51
52
53
54
55
A
B
C
PI-8
GMDATA
R49
1800
MDDATA
MDGCKN
MDGCKA
MDOHQ2A
MDDLDIN
61B AR
22A Q
73B AP
U31
4013
SDI
DI
CPI
CP2
SD2
D2
CDI
CD2
QI
Q̄I
Q2
Q̄2
VDD
VSS
MDDIA
A 73B
MDDLDON
P/O
U9
4071
MDDOHA
MDRTIA
34B AJ
MDFPCA
MD32XN
23C AD
12A J
U13
4081
MDRT2A
U24
4071
MDRT3A
MDMXDA
AA 25B
MDDQ01A
U1
40097
MDBI2N
PI-104
U7
4023
MDDLDIN
MDSC4A
12C K
U27
40161
CP
PE
P0
PI
P2
P3
CET
CEP
MR
Q0
Q1
Q2
Q3
TC
VDD
VSS
MDDQ01A
MDDQ11A
MDDQ21A
MDDQ31A
U29
4069
MDDQ3IN
U34
4023
MDDEIN
MDDLPA
MDDOHN
35B
AK
AL
AQ 4B
MDDLPA
MDENDA
24C AB
U26
4724
A0
A1
A2
E
D
CL
MDD01AA
MDD02AA
MDD03AA
MDD04AA
MDPSVA
D 5C, 57C
U42
40174
MDD02A
MDD01A
MDD04A
MDD03A
PI-78
PI-77
PI-80
PI-79
R59
4700
TP6
MDD05A
MDD06A
MDD07A
MDD08A
MDB0IN
PI-81
PI-22
PI-20
PI-21
PI-10
B 5A
U37
TP7
R43
4700
U8
4011
MDDE2N
MDDGRPA
MDGCKN
22A I
MDGRDN
11A,65B G
U33
40161
MDDQ12A
MDDQ02A
MDDQ22A
MDPSVA
54B D
MDDGRPA
35C AM
+10V
R51
47K
AQ 4B
U32
4724
MDD16A
MDD15A
MDD14A
MDD13A
MDD12A
MDD11A
MDD10A
MDD09A
PI-16
PI-17
PI-18
PI-19
PI-76
PI-75
PI-74
PI-73
EL1WL120

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 6 of 8)

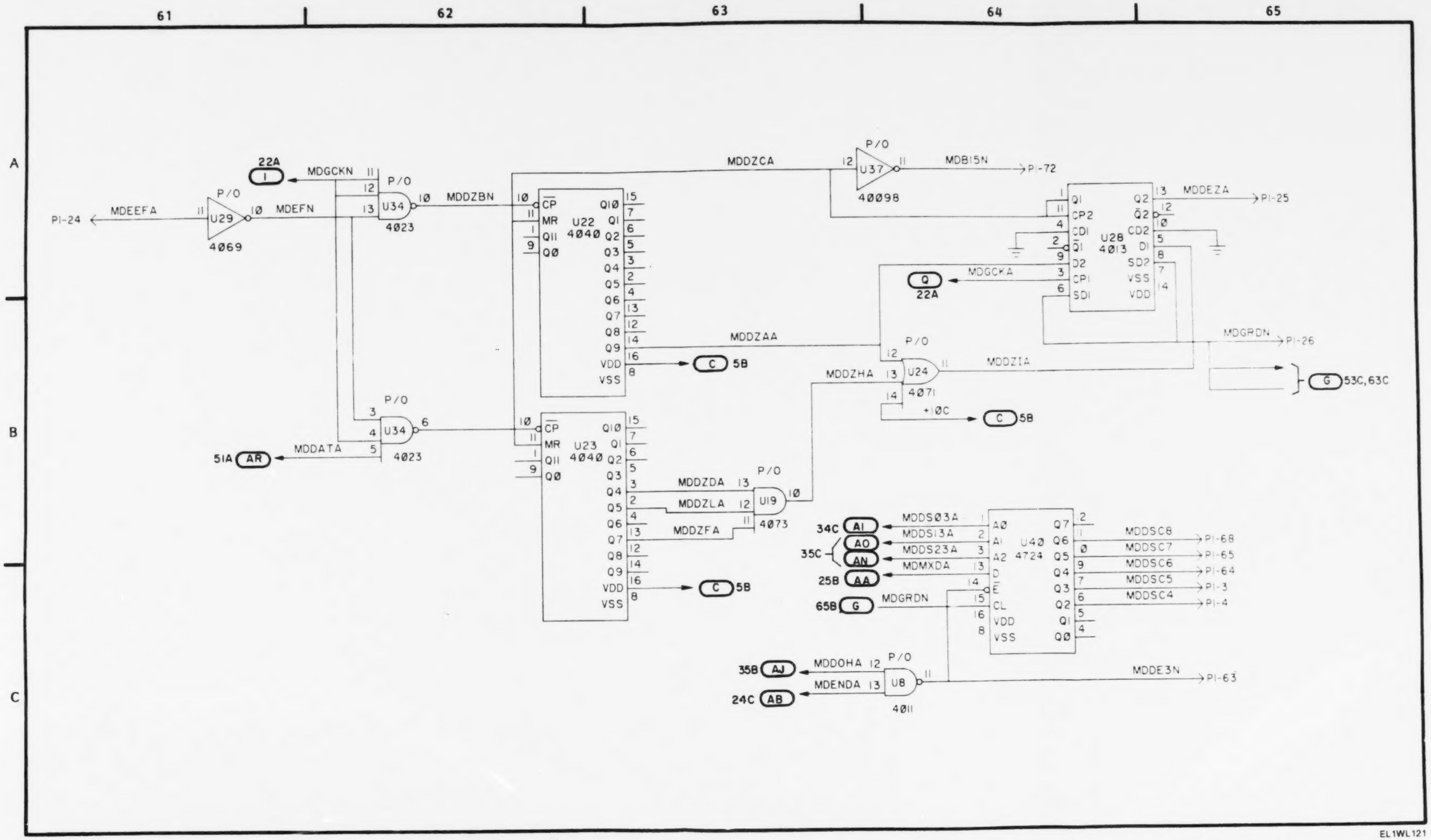

61
62
63
64
65
A
B
C
PI-24
MDEEFA
P/O
U29
4069
MDEFN
22A
I
MDGCKN
U34
4023
MDDZBN
CP
MR
Q11
Q0
U22
4040
Q10
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
VDD
VSS
C 5B
MDDZCA
U37
40098
MDB15N
PI-72
U28
4013
CP2
CD1
D2
CP1
SD1
Q2
CD2
D1
SD2
MDDEZA
PI-25
MDGCKA
Q
22A
MDDZAA
MDDZHA
U24
4071
MDDZIA
+10C
C 5B
MDGRDN
PI-26
G 53C,63C
51A AR
MDDATA
U23
4040
MDDZDA
MDDZLA
MDDZFA
U19
4073
C 5B
34C AI
35C AO
AN
25B AA
65B G
MDDS03A
MDDS13A
MDDS23A
MDMXDA
MDGRDN
A0
A1
A2
D
E
CL
U40
4724
Q7
Q6
Q5
Q4
Q3
Q2
Q1
Q0
MDDSC8
MDDSC7
MDDSC6
MDDSC5
MDDSC4
PI-68
PI-65
PI-64
PI-3
PI-4
35B AJ
24C AB
MDDOHA
MDENDA
U8
4011
MDDE3N
PI-63
EL1WL121

Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 7 of 8)

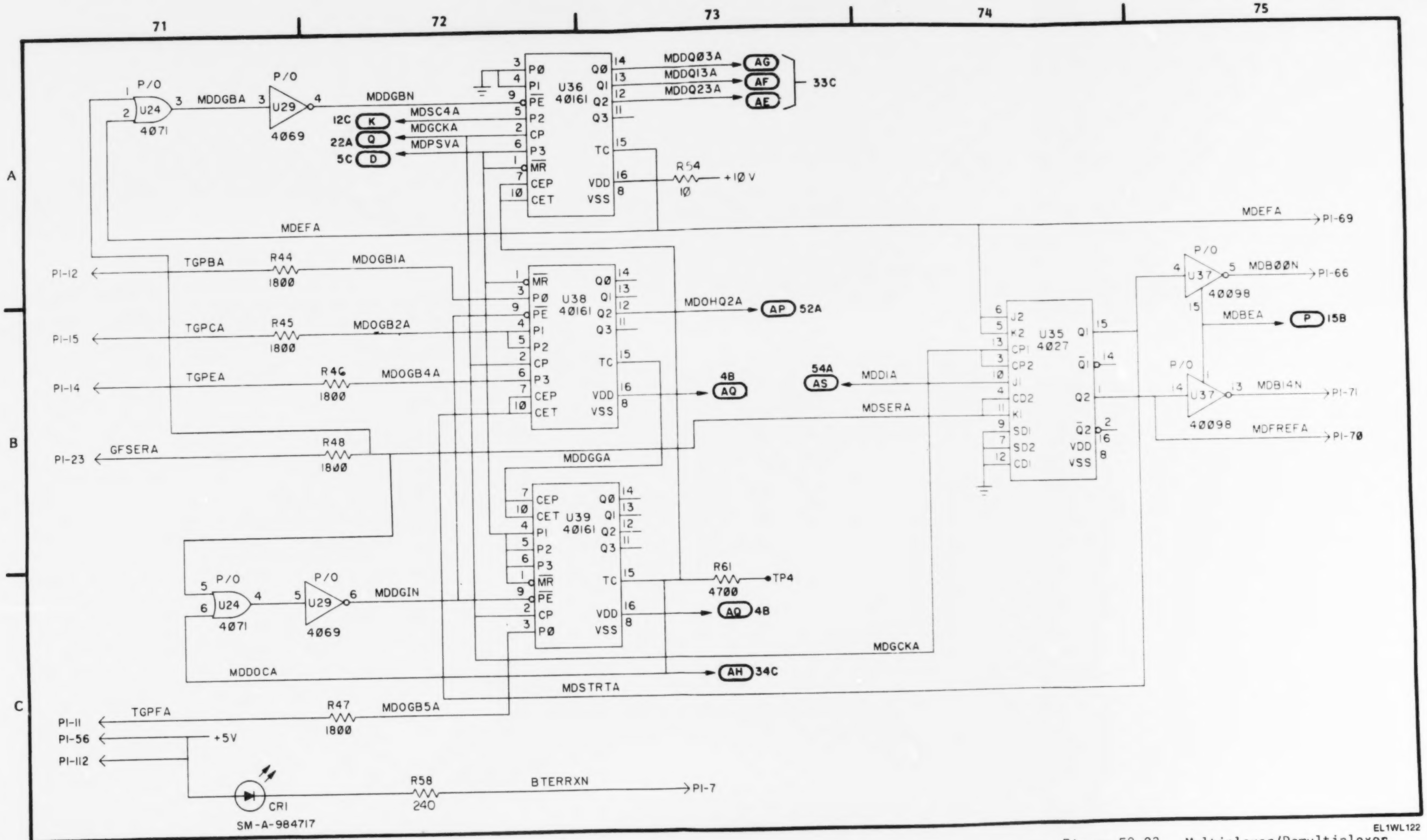

71
72
73
74
75
A
B
C
P/O
U24
4071
MDDGBA
U29
4069
MDDGBN
MDSC4A
MDGCKA
MDPSVA
12C K
22A Q
5C D
U36
40161
P0
P1
PE
P2
CP
P3
MR
CEP
CET
Q0
Q1
Q2
Q3
TC
VDD
VSS
MDDQ03A
MDDQ13A
MDDQ23A
AG
AF
AE
33C
R54
10
+10 V
MDEFA
PI-69
PI-12
TGPBA
R44
1800
MDOGB1A
PI-15
TGPCA
R45
1800
MDOGB2A
PI-14
TGPEA
R46
1800
MDOGB4A
U38
40161
MDOHQ2A
AP 52A
4B
AQ
54A
AS
MDDIA
MDSERA
PI-23
GFSERA
R48
1800
MDDGGA
U39
40161
R61
4700
TP4
AQ 4B
MDDGIN
MDDOCA
MDGCKA
AH 34C
MDSTRTA
PI-11
TGPFA
R47
1800
MDOGB5A
PI-56
+5V
PI-112
CR1
SM-A-984717
R58
240
BTERRXN
PI-7
U35
4027
J2
K2
CP1
CP2
J1
CD2
K1
SD1
SD2
CD1
U37
40098
MDB00N
PI-66
MDBEA
P 15B
MDB14N
PI-71
MDFREFA
PI-70
EL1WL122

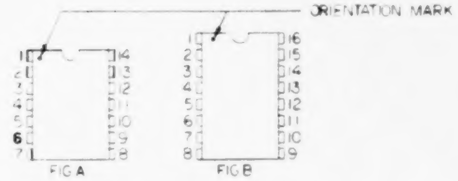
Figure FO-23. Multiplexer/Demultiplexer CCA A8,A13, Schematic Diagram (Sheet 8 of 8)

NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S)
2. UNLESS OTHERWISE SPECIFIED:
   A. RESISTANCE VALUES ARE IN OHMS ±2%,1/4 W
   B. CAPACITANCE VALUES ARE IN MICROFARADS,±10%,50V
3. ▭ INDICATES MARKING ON CIRCUIT BOARD

TABLE 1

GENERIC NO.	REF DES	PART NO.	POWER PINS			FIG
			+10V	GND	-10V	LTR
4136	U1,7	997212-1	11	–	7	A
40098	U2	40098	16	8,15	–	B
40097	U3	1005469-1	16	8	–	B
3517	U4,5,8,9	1006099-1	16	8	–	B
747A	U6,10	M38510/10102BCB	9,13	–	4	A

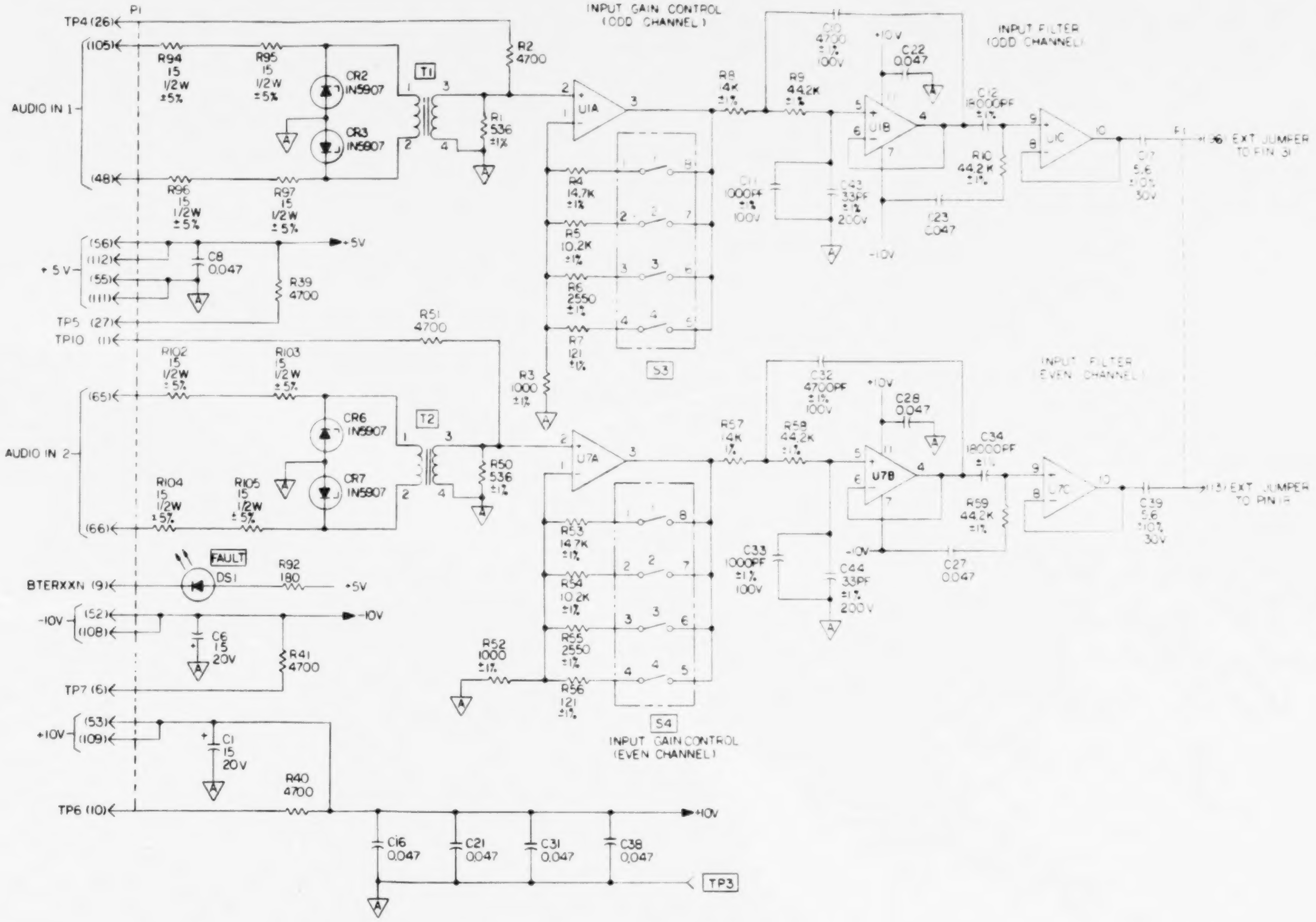

ORIENTATION MARK
1
2
3
4
5
6
7
14
13
12
11
10
9
8
FIG A
1
2
3
4
5
6
7
8
16
15
14
13
12
11
10
9
FIG B

TOP VIEW

PIN NUMBERS ARE FOR REFERENCE ONLY

TABLE 2

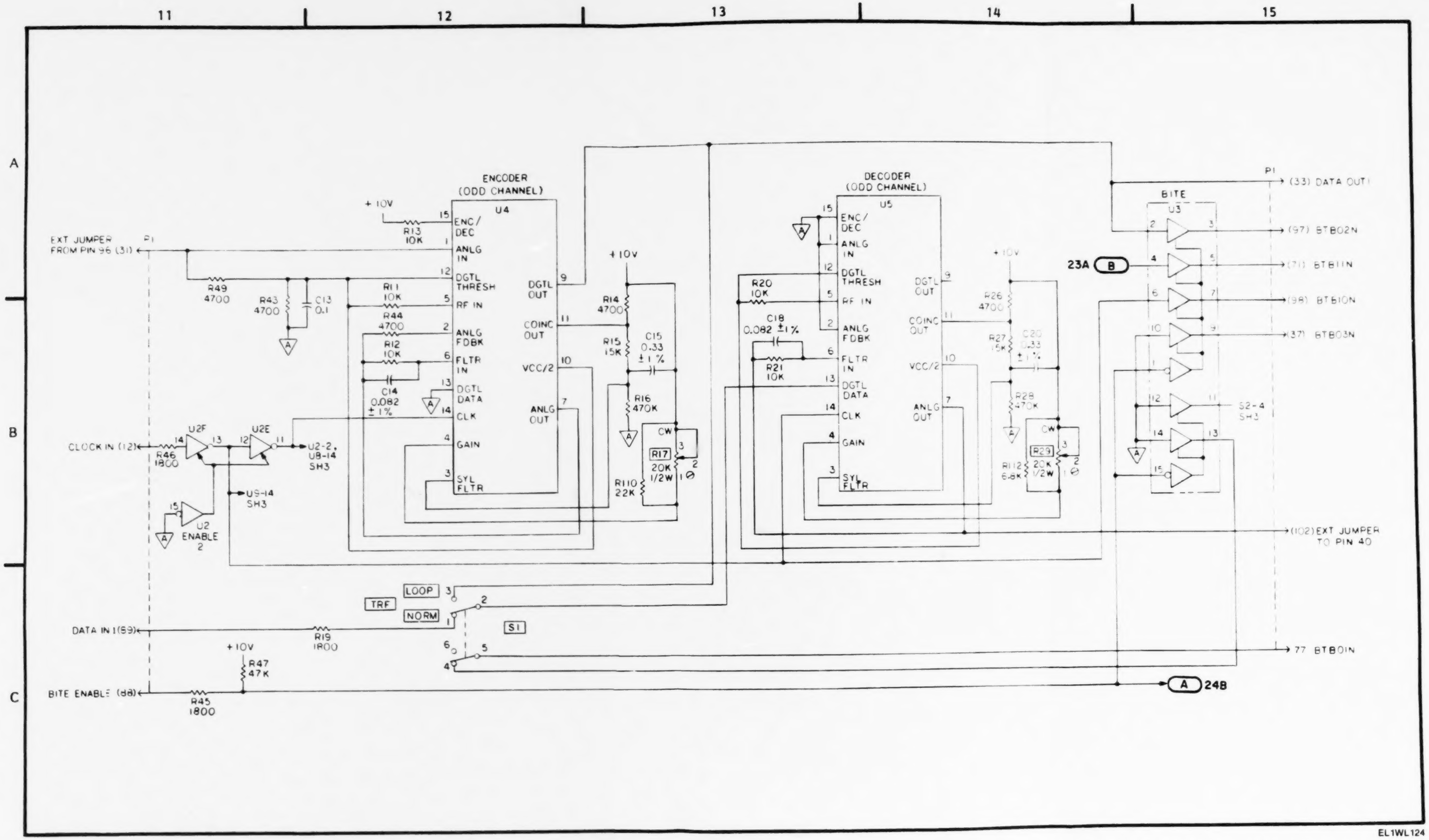
REF	DES
HIGHEST USED	NOT USED
CR9	CR1
DS1	
FL2	
C44	C2-5.26, 29, 30
S6	
T4	
U10	
R113	R38,42. 68, 88


P1
TP4 (26)
(105)
AUDIO IN 1
(48)
R94 15 1/2W ±5%
R95 15 1/2W ±5%
R96 15 1/2W ±5%
R97 15 1/2W ±5%
CR2 1N5907
CR3 1N5907
T1
R2 4700
R1 536 ±1%
U1A
INPUT GAIN CONTROL (ODD CHANNEL)
R4 14.7K ±1%
R5 10.2K ±1%
R6 2550 ±1%
R7 121 ±1%
S3
R3 1000 ±1%
R8 14K ±1%
R9 44.2K ±1%
C10 4700 ±1% 100V
+10V
C22 0.047
U1B
C11 1000PF ±1% 100V
C43 33PF ±1% 200V
-10V
C23 0.047
C12 18000PF ±1%
R10 44.2K ±1%
U1C
INPUT FILTER (ODD CHANNEL)
C17 5.6 ±10% 30V
F1
(36) EXT JUMPER TO PIN 31
+5 V
(56)
(112)
(55)
(111)
C8 0.047
+5V
R39 4700
TP5 (27)
TP10 (1)
R51 4700
R102 15 1/2W ±5%
R103 15 1/2W ±5%
(65)
AUDIO IN 2
(66)
R104 15 1/2W ±5%
R105 15 1/2W ±5%
CR6 1N5907
CR7 1N5907
T2
R50 536 ±1%
U7A
R53 14.7K ±1%
R54 10.2K ±1%
R55 2550 ±1%
R56 121 ±1%
R52 1000 ±1%
S4
INPUT GAIN CONTROL (EVEN CHANNEL)
R57 14K 1%
R58 44.2K ±1%
C32 4700PF ±1% 100V
+10V
C28 0.047
U7B
C33 1000PF ±1% 100V
C44 33PF ±1% 200V
-10V
C27 0.047
C34 18000PF ±1%
R59 44.2K ±1%
U7C
INPUT FILTER (EVEN CHANNEL)
C39 5.6 ±10% 30V
(13) EXT JUMPER TO PIN 18
FAULT
DS1
BTERXXN (9)
R92 180
+5V
-10V
(52)
(108)
C6 15 20V
-10V
R41 4700
TP7 (6)
+10V
(53)
(109)
C1 15 20V
R40 4700
TP6 (10)
+10V
C16 0.047
C21 0.047
C31 0.047
C38 0.047
TP3
A

REV D

EL1WL123

Figure FO-24. Analog Applique Unit CCA A9-A12 Schematic Diagram (Sheet 1 of 4)


11
12
13
14
15
A
B
C
ENCODER
(ODD CHANNEL)
U4
+10V
R13
10K
15
ENC/
DEC
1
ANLG
IN
12
DGTL
THRESH
5
RF IN
2
ANLG
FDBK
6
FLTR
IN
13
DGTL
DATA
14
CLK
4
GAIN
3
SYL
FLTR
9
DGTL
OUT
11
COINC
OUT
10
VCC/2
7
ANLG
OUT
EXT JUMPER
FROM PIN 96 (31)
P1
R49
4700
R43
4700
C13
0.1
R11
10K
R44
4700
R12
10K
C14
0.082
±1%
A
CLOCK IN (12)
R46
1800
U2F
14
13
U2E
12
11
U2-2,
U8-14
SH3
U9-14
SH3
15
U2
ENABLE
2
+10V
R14
4700
R15
15K
C15
0.33
±1%
R16
470K
CW
R17
20K
1/2W
3
2
1
R110
22K
DECODER
(ODD CHANNEL)
U5
R20
10K
C18
0.082 ±1%
R21
10K
+10V
R26
4700
R27
15K
C20
0.33
±1%
R28
470K
R29
20K
1/2W
R112
6.8K
BITE
U3
P1
(33) DATA OUT1
(97) BTBO2N
23A
B
(71) BTB11N
(98) BTB10N
(37) BTBO3N
S2-4
SH3
(102) EXT JUMPER
TO PIN 40
LOOP
TRF
NORM
S1
DATA IN 1(89)
R19
1800
+10V
R47
47K
77 BTBOIN
BITE ENABLE (88)
R45
1800
A
24B

EL1WL124

Figure FO-24. Analog Applique Unit CCA A9-A12 Schematic Diagram (Sheet 2 of 4)

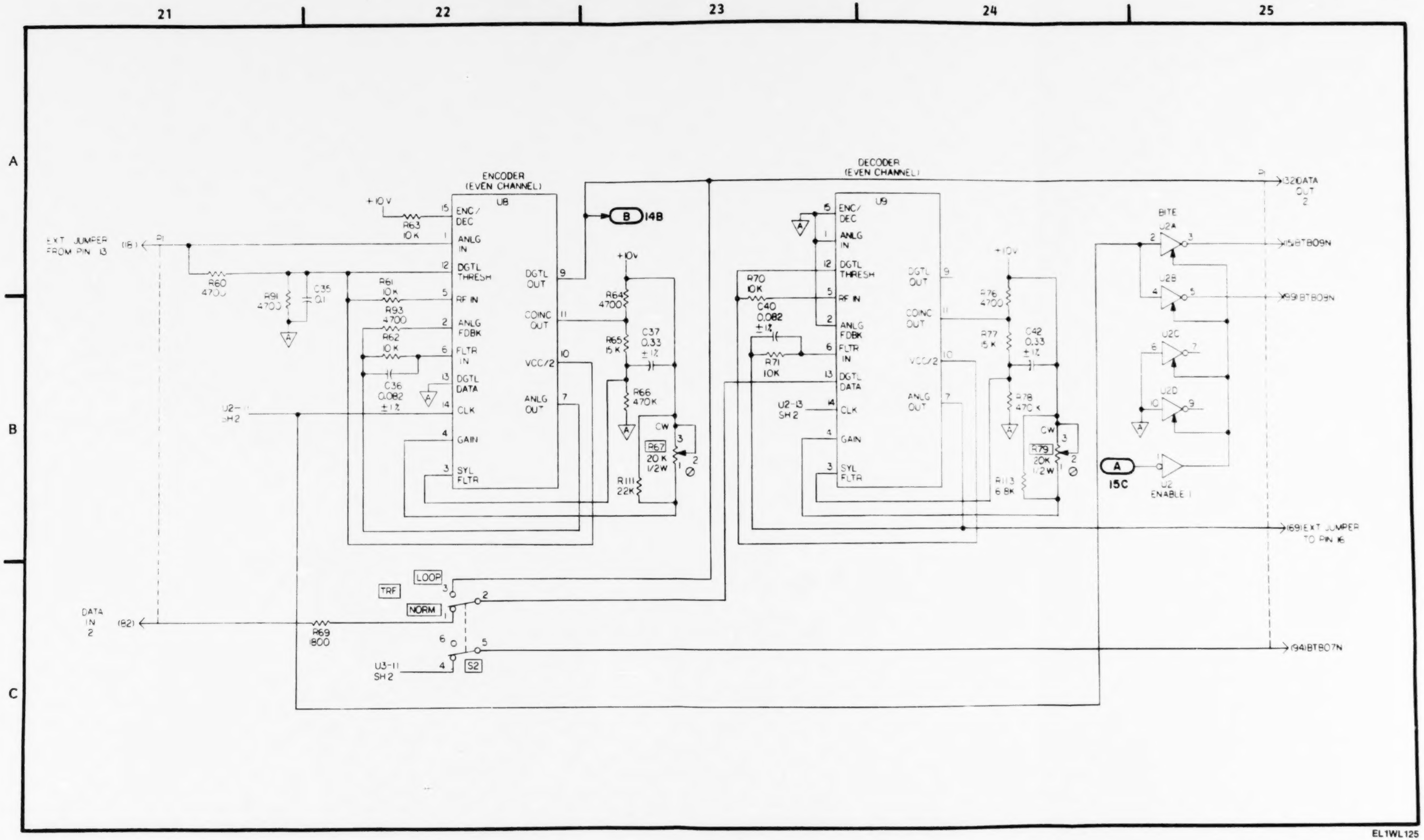

21
22
23
24
25
A
B
C
ENCODER
(EVEN CHANNEL)
U8
+10V
R63
10K
ENC/
DEC
ANLG
IN
DGTL
THRESH
RF IN
ANLG
FDBK
FLTR
IN
DGTL
DATA
CLK
GAIN
SYL
FLTR
DGTL
OUT
COINC
OUT
VCC/2
ANLG
OUT
B
14B
EXT JUMPER
FROM PIN 13
(18)
P1
R60
4700
R91
4700
C35
0.1
R61
10K
R93
4700
R62
10K
C36
0.082
±1%
U2-11
SH2
+10V
R64
4700
R65
15K
C37
0.33
±1%
R66
470K
CW
R67
20K
1/2W
R111
22K
LOOP
TRF
NORM
DATA
IN
2
(82)
R69
1800
U3-11
SH2
S2
DECODER
(EVEN CHANNEL)
U9
R70
10K
C40
0.082
±1%
R71
10K
U2-13
SH 2
+10V
R76
4700
R77
15K
C42
0.33
±1%
R78
470K
R79
20K
1/2W
R113
6.8K
(32)DATA
OUT
2
BITE
U2A
U2B
U2C
U2D
(15)BTB09N
(99)BTB09N
A
15C
U2
ENABLE 1
(69)EXT JUMPER
TO PIN 16
(94)BTB07N
EL1WL125

Figure FO-24. Analog Applique Unit CCA A9-A12
Schematic Diagram
(Sheet 3 of 4)

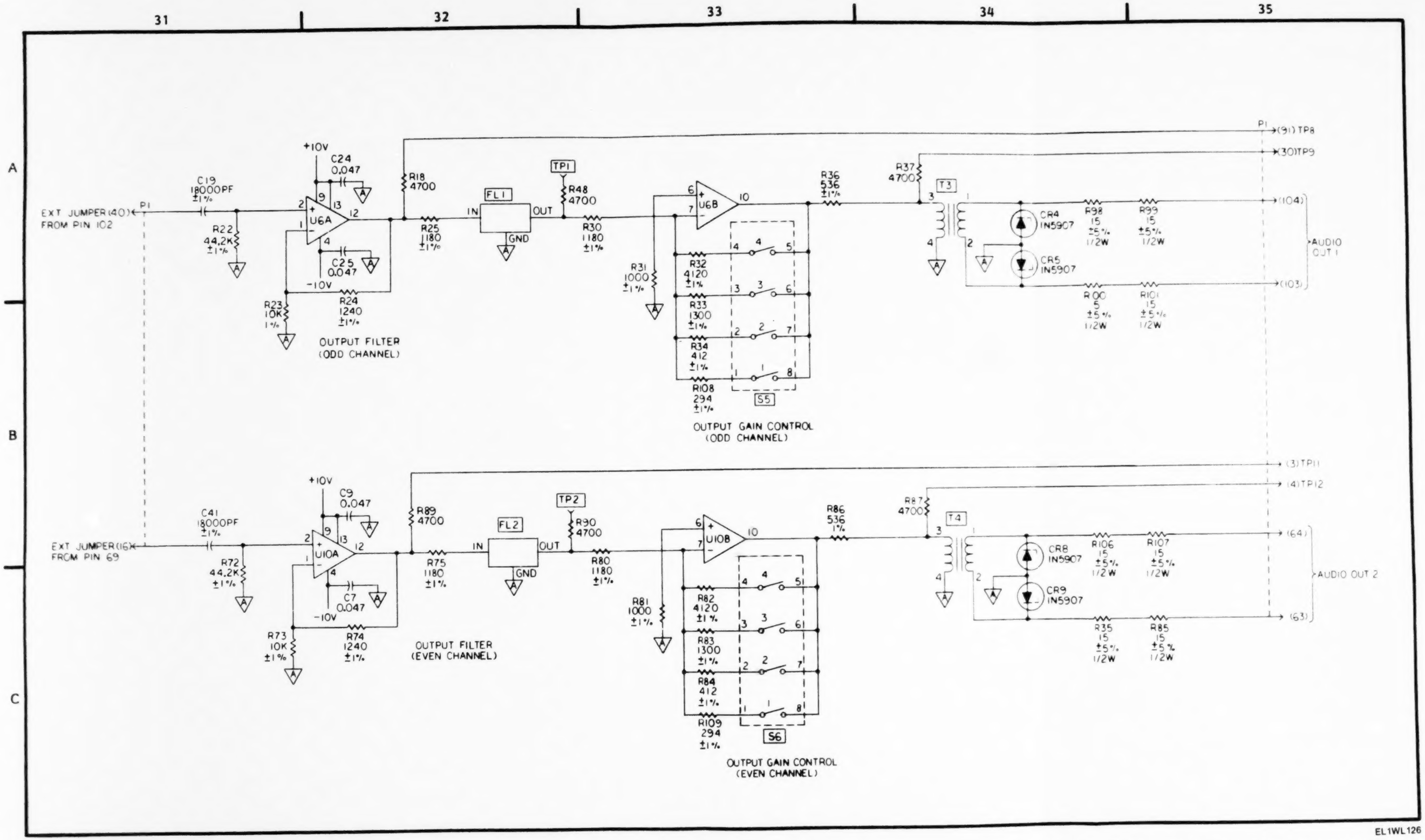
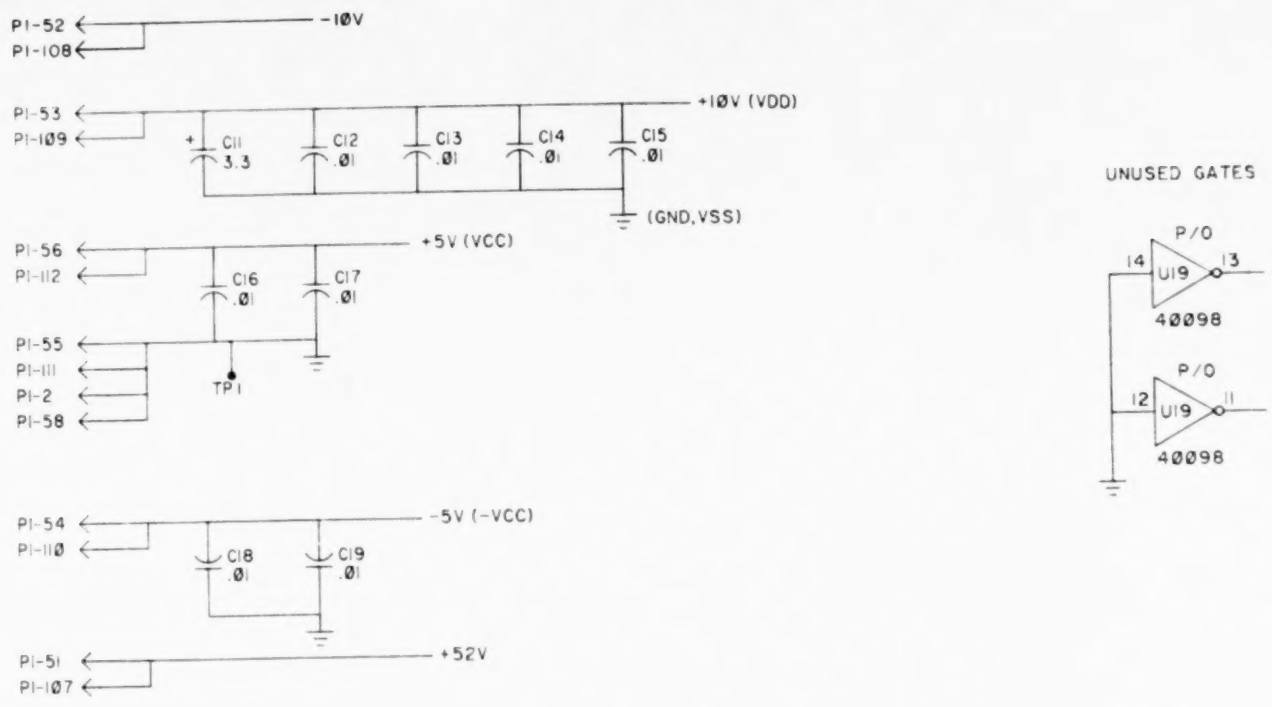

31
32
33
34
35
A
B
C
EXT JUMPER (40)
FROM PIN 102
P1
C19
18000PF
±1%
R22
44.2K
±1%
+10V
C24
0.047
U6A
C25
0.047
-10V
R23
10K
1%
R24
1240
±1%
OUTPUT FILTER
(ODD CHANNEL)
R18
4700
R25
1180
±1%
FL1
IN
OUT
GND
TP1
R48
4700
R30
1180
±1%
U6B
R31
1000
±1%
R32
4120
±1%
R33
1300
±1%
R34
412
±1%
R108
294
±1%
S5
OUTPUT GAIN CONTROL
(ODD CHANNEL)
R36
536
±1%
R37
4700
T3
CR4
IN5907
CR5
IN5907
R98
15
±5%
1/2W
R99
15
±5%
1/2W
R100
5
±5%
1/2W
R101
15
±5%
1/2W
P1
(91) TP8
(30) TP9
(104)
(103)
AUDIO OUT 1
(3) TP11
(4) TP12
EXT JUMPER (16)
FROM PIN 69
C41
18000PF
±1%
R72
44.2K
±1%
+10V
C9
0.047
U10A
C7
0.047
-10V
R73
10K
±1%
R74
1240
±1%
OUTPUT FILTER
(EVEN CHANNEL)
R89
4700
R75
1180
±1%
FL2
IN
OUT
GND
TP2
R90
4700
R80
1180
±1%
U10B
R81
1000
±1%
R82
4120
±1%
R83
1300
±1%
R84
412
±1%
R109
294
±1%
S6
OUTPUT GAIN CONTROL
(EVEN CHANNEL)
R86
536
1%
R87
4700
T4
CR8
IN5907
CR9
IN5907
R106
15
±5%
1/2W
R107
15
±5%
1/2W
R35
15
±5%
1/2W
R85
15
±5%
1/2W
(64)
(63)
AUDIO OUT 2
EL1WL126

Figure FO-24. Analog Applique Unit CCA A9-A12 Schematic Diagram (Sheet 4 of 4)
]


P1-52
P1-108
-10V
P1-53
P1-109
+10V (VDD)
C11 3.3
C12 .01
C13 .01
C14 .01
C15 .01
(GND,VSS)
P1-56
P1-112
+5V (VCC)
C16 .01
C17 .01
P1-55
P1-111
P1-2
P1-58
TP1
P1-54
P1-110
-5V (-VCC)
C18 .01
C19 .01
P1-51
P1-107
+52V
UNUSED GATES
P/O
14
U19
13
4009B
P/O
12
U19
11
4009B

HIGHEST REFERENCE DESIGNATIONS		
CR31	C29	P1
Q6	R87	S2
T4	U34	TP3

REFERENCE DESIGNATIONS NOT USED		
CR13		CR26

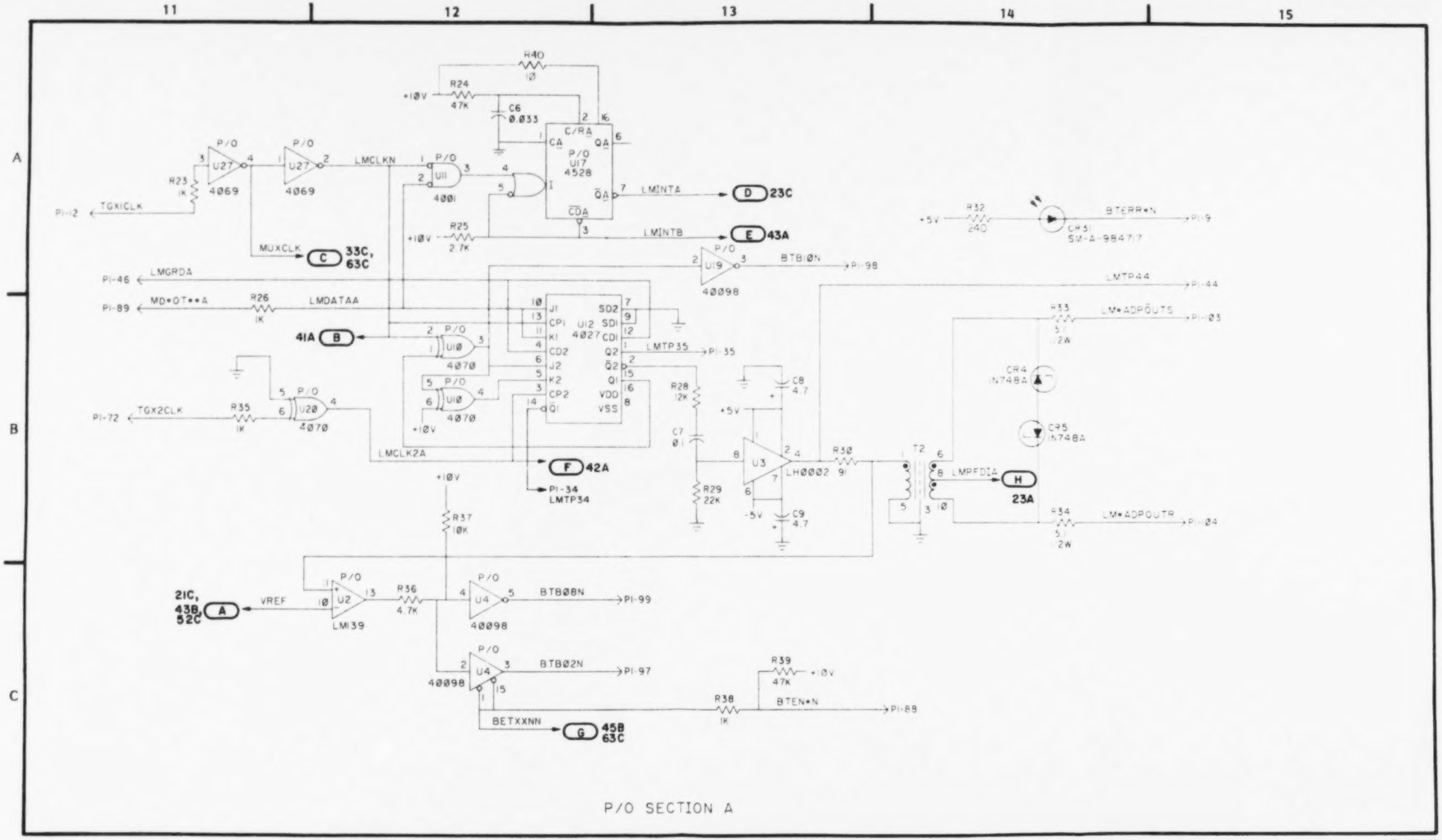
NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. • DENOTES TEST POINT.
3. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTANCE VALUES ARE IN OHMS,1/4 WATT ±2%.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
4. THIS DIAGRAM CONFORMS TO ANSI Y32.14-1973, GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
5. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.
6. SECTION B IS TOP HALF OF CARD AND GOES TO ODD NUMBERED LOOPS (1,3,5,7).
   SECTION A IS BOTTOM HALF OF CARD AND GOES TO EVEN NUMBERED LOOPS (2,4,6,8).
7. IC VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS:
   U5,U6,U10,U11,U20,U21,U27 AND U28 PIN 7(VSS), PIN 14(VDD).
   U16 AND U17 PIN 8(VSS, PIN 16(VDD).
   U4,U19 AND U26 PIN 8(VSS).

REV H

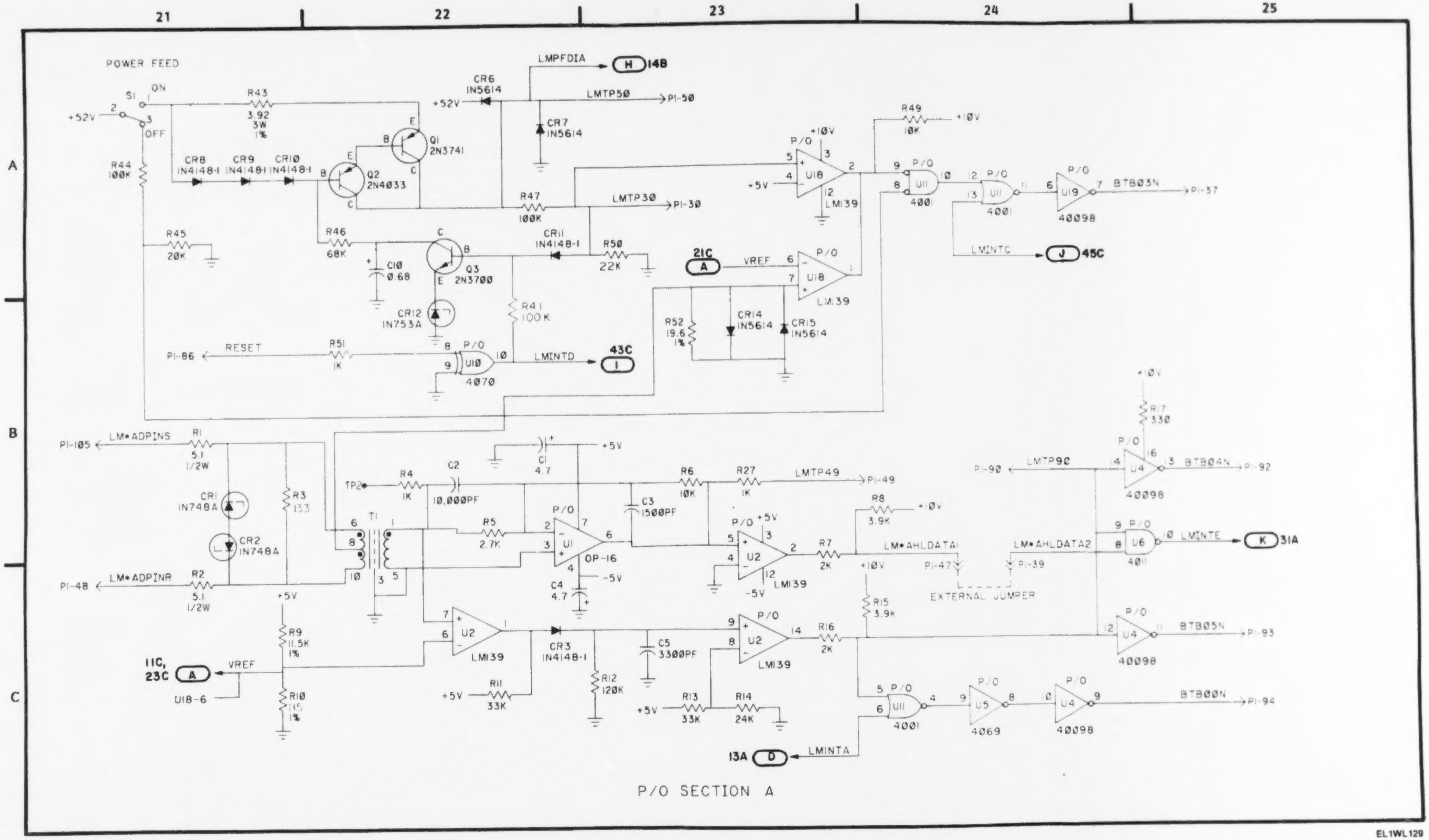
EL1WL127

Figure FO-25. Loop Modem CCA A9-A12 Schematic Diagram (Sheet 1 of 7)


11
12
13
14
15
A
B
C
R40
10
+10V
R24
47K
C6
0.033
2
16
C/RA
CA
QA
6
P/O
U17
4528
I
Q̄A
7
LMINTA
D
23C
C̄D̄Ā
3
LMINTB
E
43A
P/O
U27
3
4
4069
R23
1K
P/O
U27
1
2
4069
LMCLKN
P/O
U11
1
2
3
4001
4
5
PI-12
TGX1CLK
+10V
R25
2.7K
MUXCLK
C
33C, 63C
P/O
U19
2
3
40098
BTBI0N
PI-98
PI-46
LMGRDA
PI-89
MD•OT••A
R26
1K
LMDATAA
41A
B
P/O
U10
2
1
3
4070
P/O
U10
5
6
4
4070
+10V
U12
4027
J1
CP1
K1
CD2
J2
K2
CP2
Q̄1
SD2
SD1
CD1
Q2
Q̄2
Q1
VDD
VSS
10
13
11
4
6
5
3
14
7
9
12
1
2
15
16
8
LMTP35
PI-35
P/O
U20
5
6
4
4070
PI-72
TGX2CLK
R35
1K
LMCLK2A
F
42A
PI-34
LMTP34
R28
12K
C7
01
R29
22K
C8
4.7
+5V
U3
LH0002
8
1
2
4
6
7
-5V
C9
4.7
R30
91
T2
1
5
3
6
8
10
LMPFDIA
H
23A
LMTP44
PI-44
R33
51
1/2W
LM•ADPOUTS
PI-03
CR4
1N748A
CR5
1N748A
R34
51
1/2W
LM•ADPOUTR
PI-04
+5V
R32
240
CR31
SM-A-984717
BTERR•N
PI-9
+10V
R37
10K
21C, 43B, 52C
A
VREF
P/O
U2
LM139
11
10
13
R36
4.7K
P/O
U4
4
5
40098
BTB08N
PI-99
P/O
U4
2
3
1
15
40098
BTB02N
PI-97
R39
47K
+10V
R38
1K
BTEN•N
PI-88
BETXXNN
G
45B 63C
P/O SECTION A

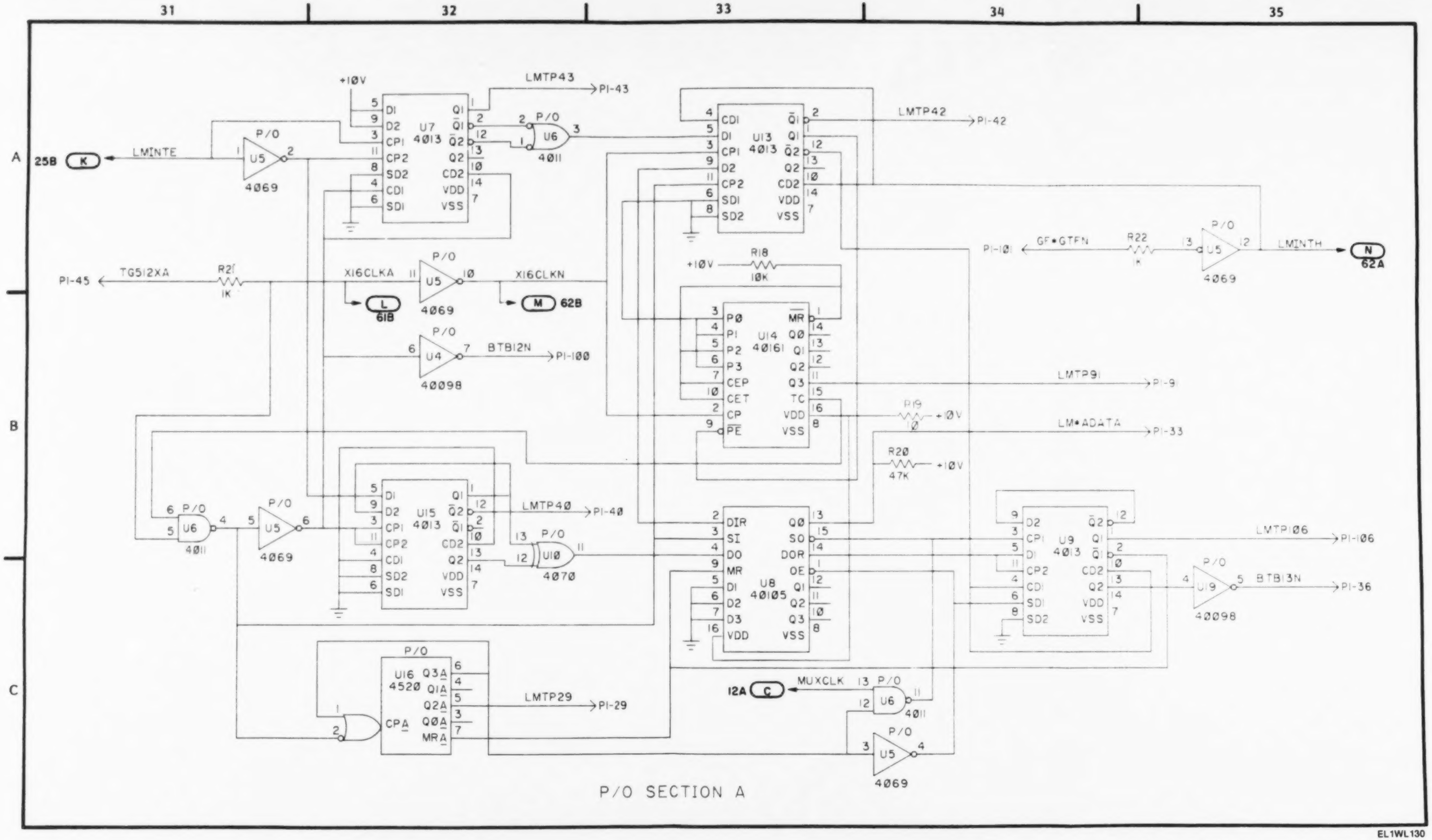
EL1WL128

Figure FO-25. Loop Modem CCA A9-A12
Schematic Diagram
(Sheet 2 of 7)


21
22
23
24
25
A
B
C
POWER FEED
S1
ON
OFF
+52V
R43
3.92
3W
1%
R44
100K
CR8
1N4148-1
CR9
1N4148-1
CR10
1N4148-1
Q2
2N4033
Q1
2N3741
+52V
CR6
1N5614
LMPFDIA
H
14B
LMTP50
P1-50
CR7
1N5614
R47
100K
LMTP30
P1-30
R45
20K
R46
68K
C10
0.68
Q3
2N3700
CR11
1N4148-1
R50
22K
CR12
1N753A
R41
100K
P1-86
RESET
R51
1K
P/O
U10
4070
LMINTD
43C
I
R49
10K
+10V
P/O
+10V
U18
+5V
LM139
P/O
U11
4001
P/O
U11
4001
P/O
U19
40098
BTB03N
P1-37
LMINTC
J
45C
21C
A
VREF
P/O
U18
LM139
R52
19.6
1%
CR14
1N5614
CR15
1N5614
P1-105
LM•ADPINS
R1
5.1
1/2W
CR1
1N748A
CR2
1N748A
R3
133
P1-48
LM•ADPINR
R2
5.1
1/2W
+5V
TP2
R4
1K
C2
10,000PF
C1
4.7
+5V
T1
R5
2.7K
P/O
U1
OP-16
-5V
C4
4.7
C3
1500PF
R6
10K
R27
1K
LMTP49
P1-49
P/O
+5V
U2
LM139
-5V
R8
3.9K
+10V
R7
2K
+10V
LM•AHLDATA1
P1-47
LM•AHLDATA2
P1-39
EXTERNAL JUMPER
R15
3.9K
+10V
R17
330
P/O
U4
40098
LMTP90
P1-90
BTB04N
P1-92
P/O
U6
4011
LMINTE
K
31A
P/O
U4
40098
BTB05N
P1-93
R9
11.5K
1%
11C,
23C
A
VREF
U18-6
R10
115
1%
P/O
U2
LM139
CR3
1N4148-1
R12
120K
+5V
R11
33K
C5
3300PF
P/O
U2
LM139
R16
2K
+5V
R13
33K
R14
24K
P/O
U11
4001
P/O
U5
4069
P/O
U4
40098
BTB00N
P1-94
13A
D
LMINTA
P/O SECTION A

EL1WL129

Figure FO-25. Loop Modem CCA A9-A12 Schematic Diagram (Sheet 3 of 7)


31
32
33
34
35
A
B
C
25B
K
LMINTE
P/O
U5
4069
+10V
U7
4013
LMTP43
P1-43
P/O
U6
4011
U13
4013
LMTP42
P1-42
P1-45
TG512XA
R21
1K
X16CLKA
U5
4069
X16CLKN
L
61B
M
62B
U4
40098
BTB12N
P1-100
+10V
R18
10K
U14
40161
GF•GTEN
P1-101
R22
1K
U5
4069
LMINTH
N
62A
LMTP91
P1-91
R19
10
+10V
LM•ADATA
P1-33
R20
47K
+10V
U6
4011
U5
4069
U15
4013
LMTP40
P1-40
U10
4070
U8
40105
U9
4013
LMTP106
P1-106
U19
40098
BTB13N
P1-36
U16
4520
LMTP29
P1-29
12A
C
MUXCLK
U6
4011
U5
4069
P/O SECTION A

EL1WL130

Figure FO-25. Loop Modem CCA A9-A12 Schematic Diagram (Sheet 4 of 7)

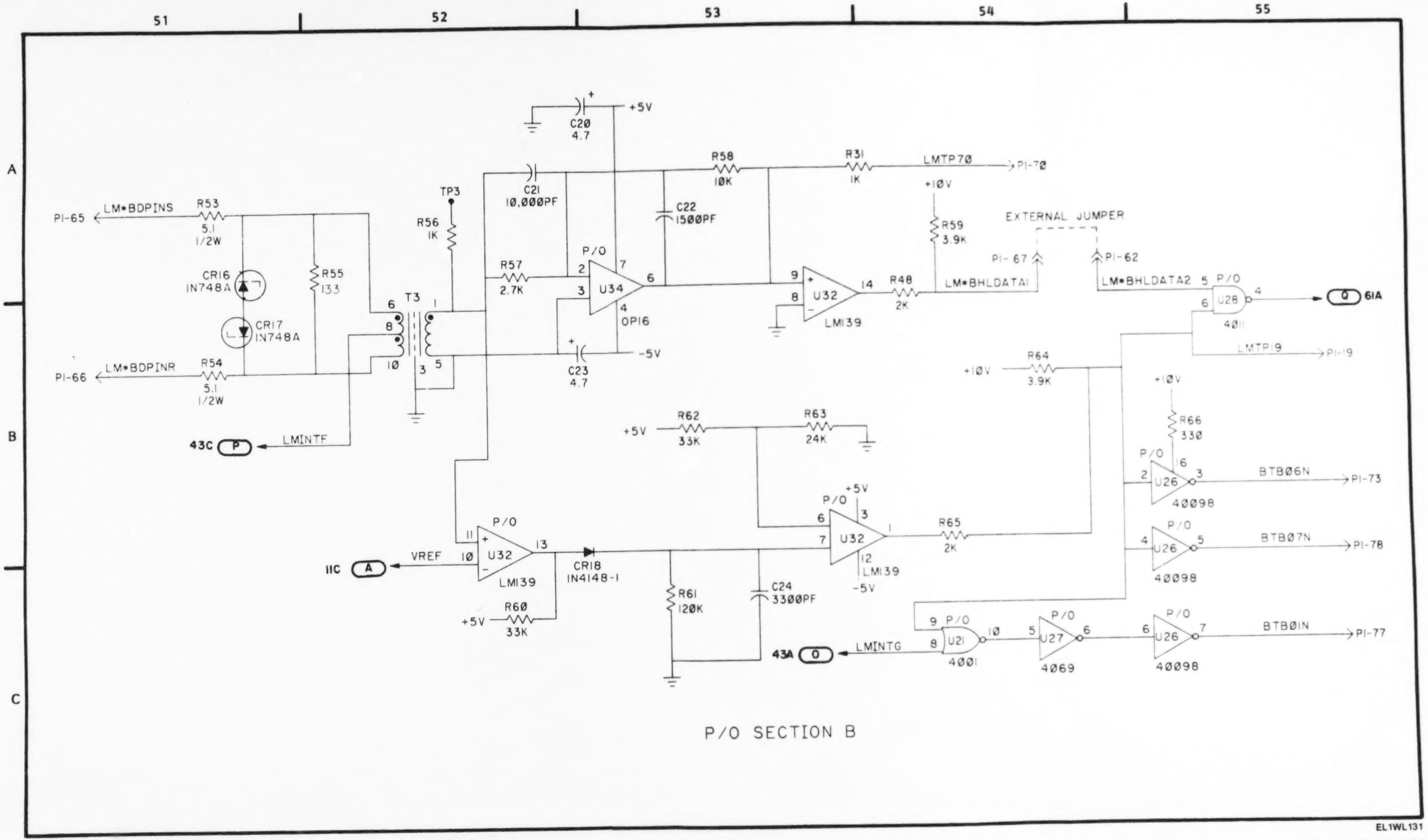
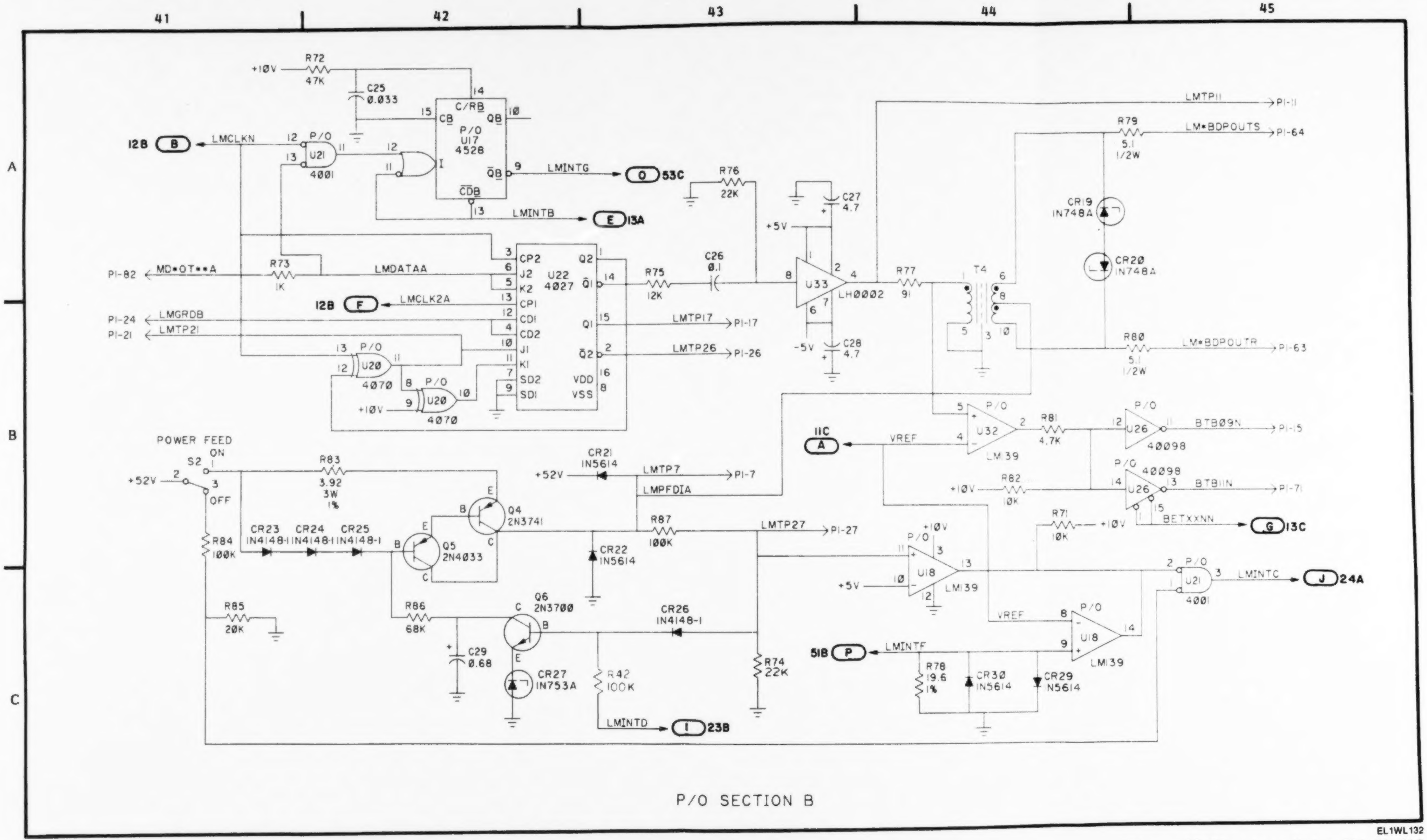
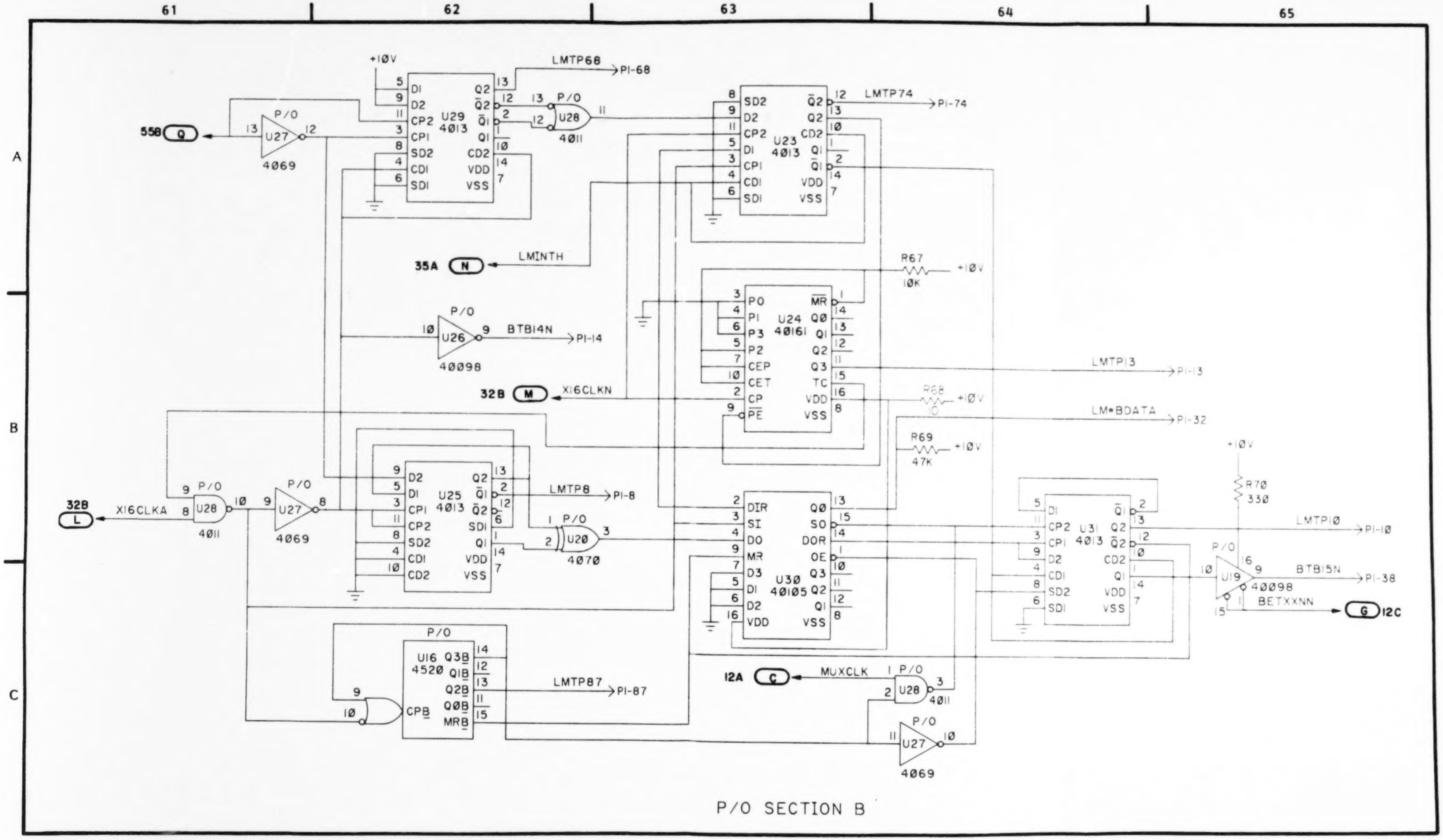

51
52
53
54
55
A
B
C
C20
4.7
+5V
C21
10,000PF
R58
10K
R31
1K
LMTP70
P1-70
+10V
TP3
C22
1500PF
R59
3.9K
EXTERNAL JUMPER
P1-65
LM*BDPINS
R53
5.1
1/2W
R56
1K
R57
2.7K
P/O
U34
OP16
P1-67
P1-62
U32
LM139
R48
2K
LM*BHLDATA1
LM*BHLDATA2
U28
4011
Q
61A
CR16
1N748A
R55
133
T3
CR17
1N748A
C23
4.7
-5V
LMTP19
P1-19
P1-66
LM*BDPINR
R54
5.1
1/2W
R64
3.9K
R66
330
R62
33K
R63
24K
43C
P
LMINTF
U26
40098
BTB06N
P1-73
R65
2K
BTB07N
P1-78
11C
A
VREF
CR18
1N4148-1
R61
120K
C24
3300PF
R60
33K
43A
O
LMINTG
U21
4001
U27
4069
BTB01N
P1-77
P/O SECTION B
EL1WL131

Figure FO-25. Loop Modem CCA A9-A12 Schematic Diagram (Sheet 5 of 7)


41
42
43
44
45
A
B
C
+10V
R72
47K
C25
0.033
14
C/RB
15
CB
10
QB
P/O
U17
4528
12B
B
LMCLKN
12
P/O
U21
13
4001
11
12
11
I
9
QB
LMINTG
O
53C
CDB
13
LMINTB
E
13A
R76
22K
C27
4.7
+5V
LMTP11
PI-11
R79
5.1
1/2W
LM•BDPOUTS
PI-64
CR19
IN748A
CR20
IN748A
PI-82
MD•OT••A
R73
1K
LMDATAA
3
CP2
6
J2
5
K2
13
CP1
12
CD1
4
CD2
10
J1
11
K1
7
SD2
9
SD1
U22
4027
Q2
Q1
Q1
Q2
VDD
VSS
1
14
15
2
16
8
R75
12K
C26
0.1
8
U33
LH0002
2
4
1
7
6
-5V
C28
4.7
R77
91
T4
1
6
8
5
3
10
R80
5.1
1/2W
LM•BDPOUTR
PI-63
12B
F
LMCLK2A
PI-24
LMGRDB
PI-21
LMTP21
LMTP17
PI-17
LMTP26
PI-26
13
P/O
U20
12
11
4070
8
P/O
9
U20
10
+10V
4070
5
P/O
U32
4
2
LM139
R81
4.7K
12
P/O
U26
11
40098
BTB09N
PI-15
11C
A
VREF
POWER FEED
ON
S2
2
1
3
OFF
+52V
R83
3.92
3W
1%
CR21
IN5614
+52V
LMTP7
PI-7
LMPFDIA
+10V
R82
10K
P/O
40098
14
U26
13
BTB11N
PI-71
15
1
BETXXNN
G
13C
R71
10K
+10V
E
B
Q4
2N3741
C
CR23
IN4148-1
CR24
IN4148-1
CR25
IN4148-1
R84
100K
E
B
Q5
2N4033
C
CR22
IN5614
R87
100K
LMTP27
PI-27
+10V
P/O
11
3
U18
10
13
+5V
12
LM139
2
P/O
U21
1
4001
3
LMINTC
J
24A
R85
20K
R86
68K
C29
0.68
Q6
2N3700
C
B
E
CR26
IN4148-1
CR27
IN753A
R42
100K
R74
22K
LMINTD
I
23B
VREF
8
P/O
U18
9
14
LM139
51B
P
LMINTF
R78
19.6
1%
CR30
IN5614
CR29
N5614
P/O SECTION B

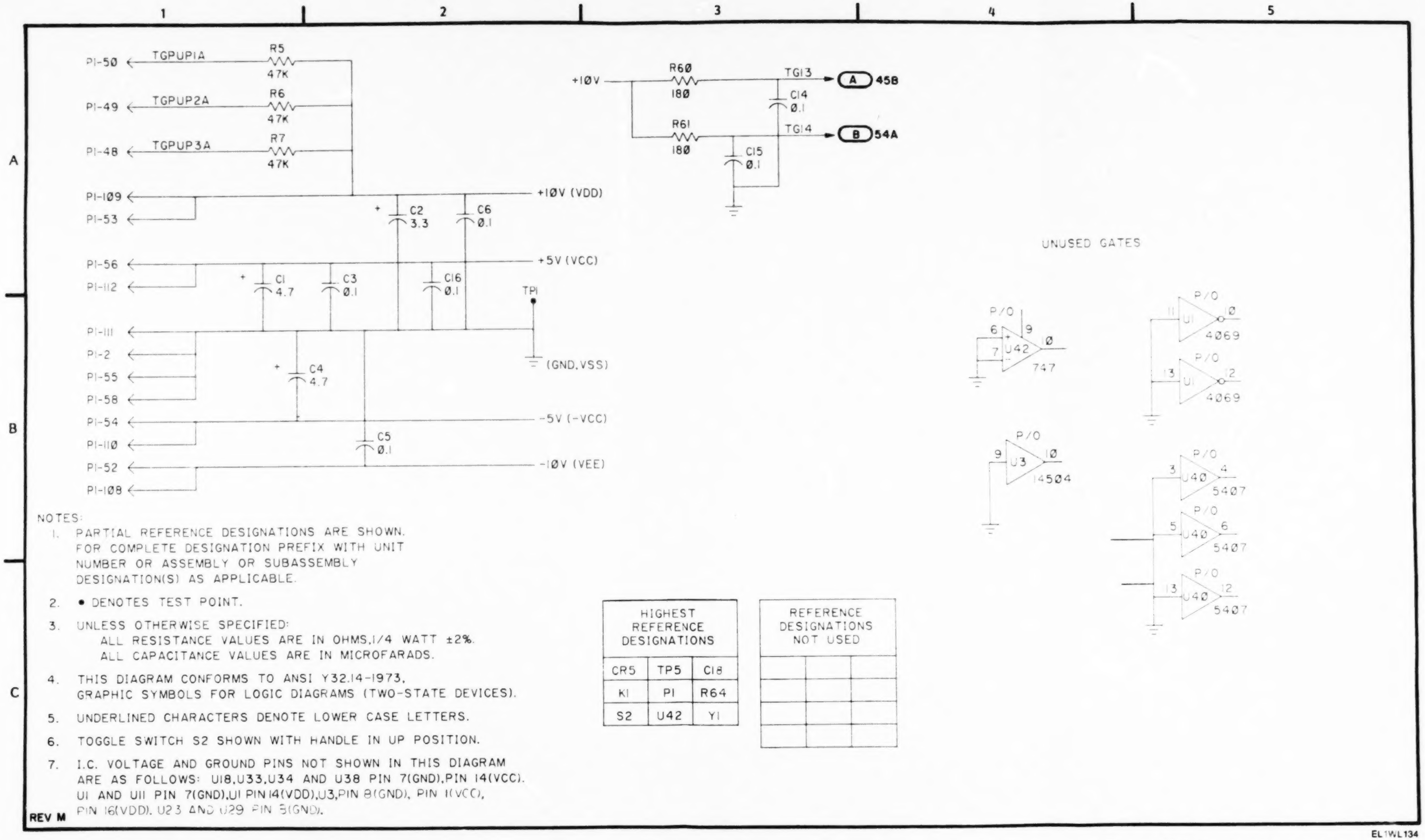
EL1WL132

Figure FO-25. Loop Modem CCA A9-A12
Schematic Diagram
(Sheet 6 of 7)


61
62
63
64
65
A
B
C
+10V
U29 4013
LMTP68
PI-68
P/O U28 4011
U23 4013
LMTP74
PI-74
55B Q
P/O U27 4069
35A N
LMINTH
R67 10K +10V
U24 40161
P/O U26 40098
BTB14N
PI-14
LMTP13
PI-13
32B M
X16CLKN
R68 10 +10V
LM*BDATA
PI-32
R69 47K +10V
+10V
R70 330
32B L
X16CLKA
P/O U28 4011
P/O U27 4069
U25 4013
LMTP8
PI-8
P/O U20 4070
U30 40105
U31 4013
LMTP10
PI-10
P/O U19 40098
BTB15N
PI-38
BETXXNN
G 12C
P/O U16 4520
LMTP87
PI-87
12A C
MUXCLK
P/O U28 4011
P/O U27 4069
P/O SECTION B

EL1WL133

Figure FO-25. Loop Modem CCA A9-A12 Schematic Diagram (Sheet 7 of 7)


1
2
3
4
5
A
B
C
P1-50
TGPUP1A
R5
47K
P1-49
TGPUP2A
R6
47K
P1-48
TGPUP3A
R7
47K
P1-109
P1-53
+10V (VDD)
C2
3.3
C6
0.1
P1-56
P1-112
+5V (VCC)
C1
4.7
C3
0.1
C16
0.1
TP1
P1-111
P1-2
P1-55
P1-58
(GND,VSS)
C4
4.7
P1-54
-5V (-VCC)
P1-110
C5
0.1
P1-52
-10V (VEE)
P1-108
+10V
R60
180
TG13
A 45B
C14
0.1
R61
180
TG14
B 54A
C15
0.1
UNUSED GATES
P/O
U42
747
P/O
U1
4069
P/O
U1
4069
P/O
U3
14504
P/O
U40
5407
P/O
U40
5407
P/O
U40
5407
REV M

NOTES:

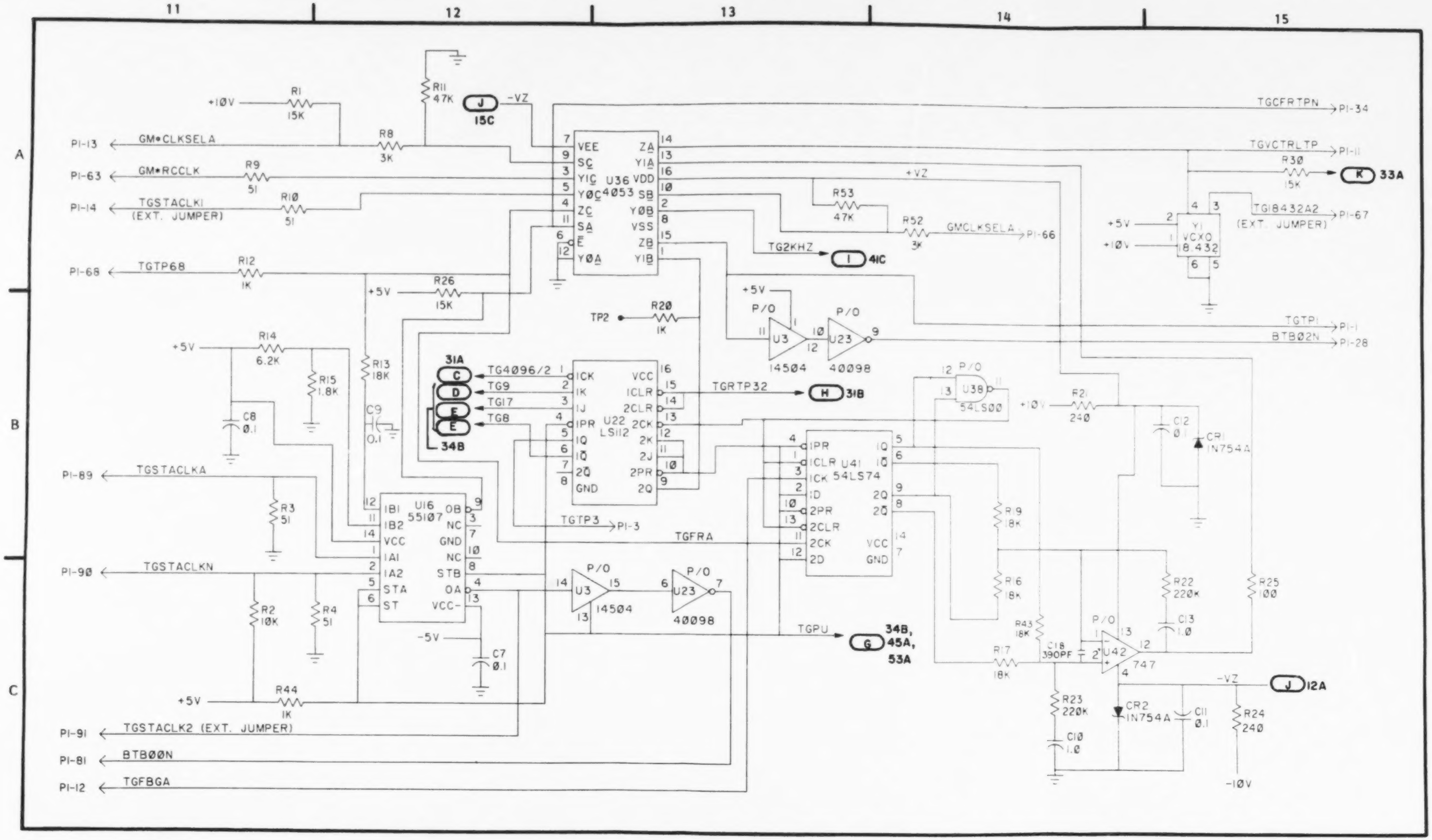
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER OR ASSEMBLY OR SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.
2. • DENOTES TEST POINT.
3. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTANCE VALUES ARE IN OHMS,1/4 WATT ±2%.
   ALL CAPACITANCE VALUES ARE IN MICROFARADS.
4. THIS DIAGRAM CONFORMS TO ANSI Y32.14-1973, GRAPHIC SYMBOLS FOR LOGIC DIAGRAMS (TWO-STATE DEVICES).
5. UNDERLINED CHARACTERS DENOTE LOWER CASE LETTERS.
6. TOGGLE SWITCH S2 SHOWN WITH HANDLE IN UP POSITION.
7. I.C. VOLTAGE AND GROUND PINS NOT SHOWN IN THIS DIAGRAM ARE AS FOLLOWS: U18,U33,U34 AND U38 PIN 7(GND),PIN 14(VCC). U1 AND U11 PIN 7(GND),U1 PIN 14(VDD),U3,PIN 8(GND), PIN 1(VCC), PIN 16(VDD). U23 AND U29 PIN 8(GND).

HIGHEST REFERENCE DESIGNATIONS		
CR5	TP5	C18
K1	P1	R64
S2	U42	Y1

REFERENCE DESIGNATIONS NOT USED		

EL1WL134

Figure FO-26. Timing Generator CCA A15 Schematic Diagram (Sheet 1 of 6)


11
12
13
14
15
A
B
C
+10V
R1
15K
R11
47K
J
15C
-VZ
P1-13
GM•CLKSELA
R8
3K
P1-63
GM•RCCLK
R9
51
P1-14
TGSTACLK1
(EXT. JUMPER)
R10
51
VEE
SC
Y1C
U36
4053
Y0C
ZC
SA
E
Y0A
ZA
Y1A
VDD
SB
Y0B
VSS
ZB
Y1B
TGCFRTPN
P1-34
TGVCTRLTP
P1-11
R30
15K
K
33A
+VZ
R53
47K
R52
3K
GMCLKSELA
P1-66
TG18432A2
(EXT. JUMPER)
P1-67
+5V
+10V
Y1
VCXO
18.432
TG2KHZ
I
41C
P1-68
TGTP68
R12
1K
+5V
R26
15K
TP2
R20
1K
+5V
P/O
U3
14504
P/O
U23
40098
TGTP1
P1-1
BTB02N
P1-28
+5V
R14
6.2K
R15
1.8K
R13
18K
31A
C
D
E
E
34B
TG4096/2
TG9
TG17
TG8
1CK
1K
1J
1PR
1Q
1Q̄
2Q̄
GND
U22
LS112
VCC
1CLR
2CLR
2CK
2K
2J
2PR
2Q
TGRTP32
H
31B
P/O
U38
54LS00
+10V
R21
240
C12
0.1
CR1
1N754A
C8
0.1
C9
0.1
P1-89
TGSTACLKA
R3
51
1B1
1B2
VCC
1A1
1A2
STA
ST
U16
55107
0B
NC
GND
NC
STB
0A
VCC-
TGTP3
P1-3
TGFRA
1PR
1CLR
1CK
1D
2PR
2CLR
2CK
2D
U41
54LS74
1Q
1Q̄
2Q
2Q̄
VCC
GND
R19
18K
R16
18K
R22
220K
R25
100
P1-90
TGSTACLKN
R2
10K
R4
51
-5V
C7
0.1
P/O
U3
14504
P/O
U23
40098
TGPU
G
34B,
45A,
53A
R43
18K
C18
390PF
R17
18K
P/O
U42
747
C13
1.0
-VZ
J
12A
+5V
R44
1K
R23
220K
C10
1.0
CR2
1N754A
C11
0.1
R24
240
-10V
P1-91
TGSTACLK2 (EXT. JUMPER)
P1-81
BTB00N
P1-12
TGFBGA

EL1WL135

Figure FO-26. Timing Generator CCA A15 Schematic Diagram (Sheet 2 of 6)

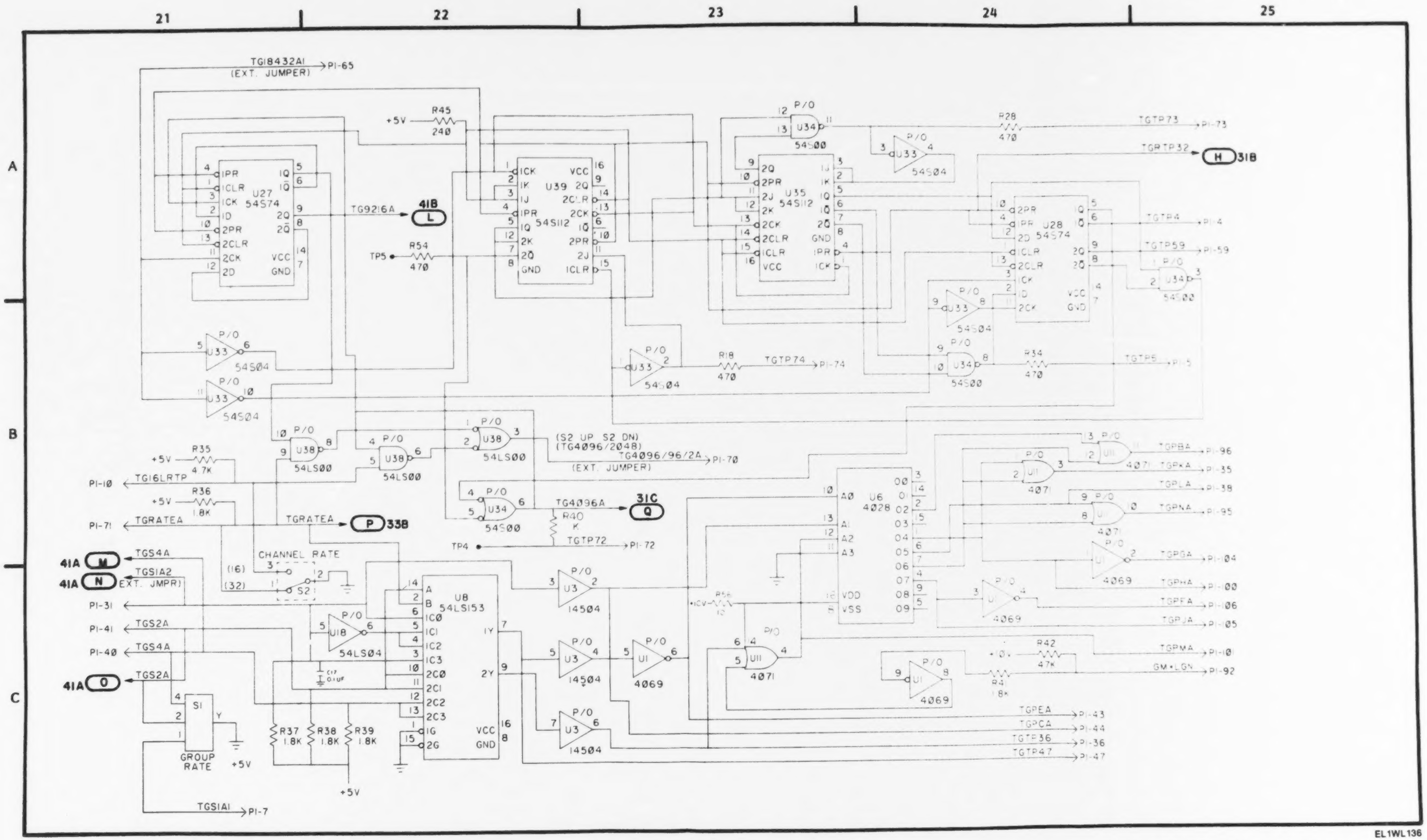
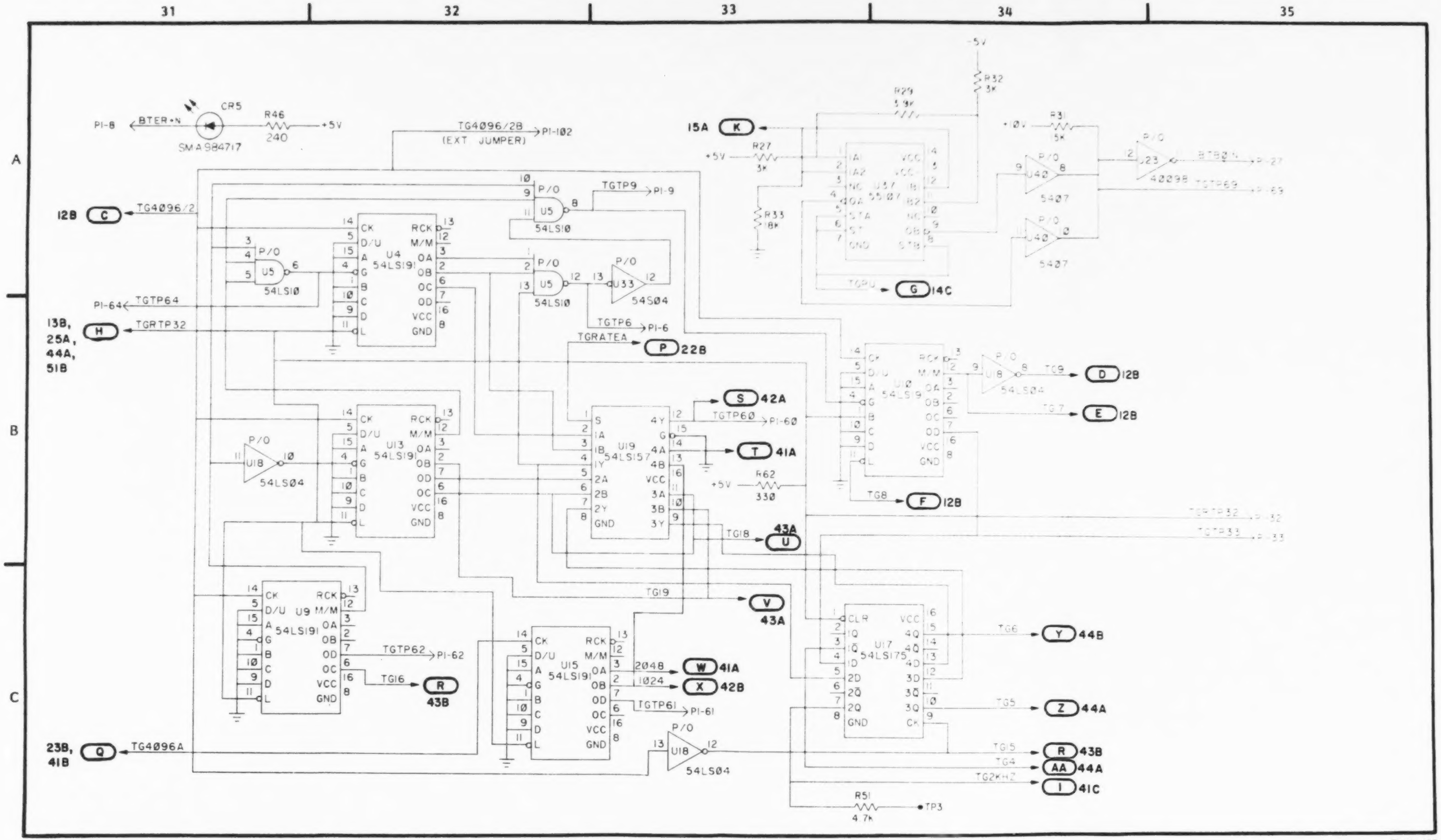

21
22
23
24
25
A
B
C
TG18432A1
(EXT. JUMPER)
P1-65
+5V
R45
240
U27
54S74
TG9216A
41B
L
TP5
R54
470
U39
54S112
P/O
U34
54S00
U35
54S112
U33
54S04
R28
470
TGTP73
P1-73
TGRTP32
H
31B
U28
54S74
TGTP4
P1-4
TGTP59
P1-59
R18
470
TGTP74
P1-74
R34
470
TGTP5
P1-5
U38
54LS00
(S2 UP S2 DN)
(TG4096/2048)
TG4096/96/2A
P1-70
(EXT. JUMPER)
+5V
R35
4.7K
P1-10
TG16LRTP
R36
1.8K
P1-71
TGRATEA
TGRATEA
P
33B
TG4096A
31C
Q
R40
TGTP72
P1-72
TP4
41A
M
TGS4A
41A
N
TGS1A2
EXT. JMPR
CHANNEL RATE
(16)
(32)
S2
P1-31
P1-41
TGS2A
P1-40
TGS4A
41A
O
TGS2A
U18
54LS04
C17
0.1UF
U8
54LS153
R37
1.8K
R38
1.8K
R39
1.8K
+5V
S1
GROUP RATE
+5V
TGS1A1
P1-7
U3
14504
U1
4069
U11
4071
U6
4028
VDD
VSS
TGPBA
P1-96
TGPKA
P1-35
TGPLA
P1-38
TGPNA
P1-95
TGPGA
P1-104
TGPHA
P1-100
TGPFA
P1-106
TGPJA
P1-105
TGPMA
P1-101
GM•LGN
P1-92
R42
47K
R41
1.8K
TGPEA
P1-43
TGPCA
P1-44
TGTP36
P1-36
TGTP47
P1-47
EL1WL136

Figure FO-26. Timing Generator CCA A15 Schematic Diagram (Sheet 3 of 6)


31
32
33
34
35
A
B
C
PI-8
BTER+N
CR5
SMA984717
R46
240
+5V
TG4096/2B
(EXT JUMPER)
PI-102
12B
C
TG4096/2
P/O
U5
54LS10
U4
54LS191
TGTP9
PI-9
U33
54S04
PI-64
TGTP64
13B, 25A, 44A, 51B
H
TGRTP32
TGTP6
PI-6
TGRATEA
P
22B
15A
K
+5V
R27
3K
R29
3.9K
R32
3K
-5V
R33
18K
U37
55107
TGPU
G
14C
+10V
R31
15K
U40
5407
U23
40098
BTB0N
PI-27
TGTP69
PI-69
U10
54LS191
U18
54LS04
TG9
D
12B
TG7
E
12B
TG8
F
12B
U13
54LS191
U19
54LS157
S
42A
TGTP60
PI-60
T
41A
+5V
R62
330
TGRTP32
PI-32
TGTP33
PI-33
TG18
43A
U
TG19
V
43A
U9
54LS191
TGTP62
PI-62
TG16
R
43B
U15
54LS191
2048
W
41A
1024
X
42B
TGTP61
PI-61
U17
54LS175
TG6
Y
44B
TG5
Z
44A
TG15
R
43B
TG4
AA
44A
TG2KHZ
I
41C
R51
4.7K
TP3
23B, 41B
Q
TG4096A
CK
D/U
RCK
M/M
OA
OB
OC
OD
VCC
GND
CLR
1Q
2Q
3Q
4Q

EL1WL137

Figure FO-26. Timing Generator CCA A15 Schematic Diagram (Sheet 4 of 6)

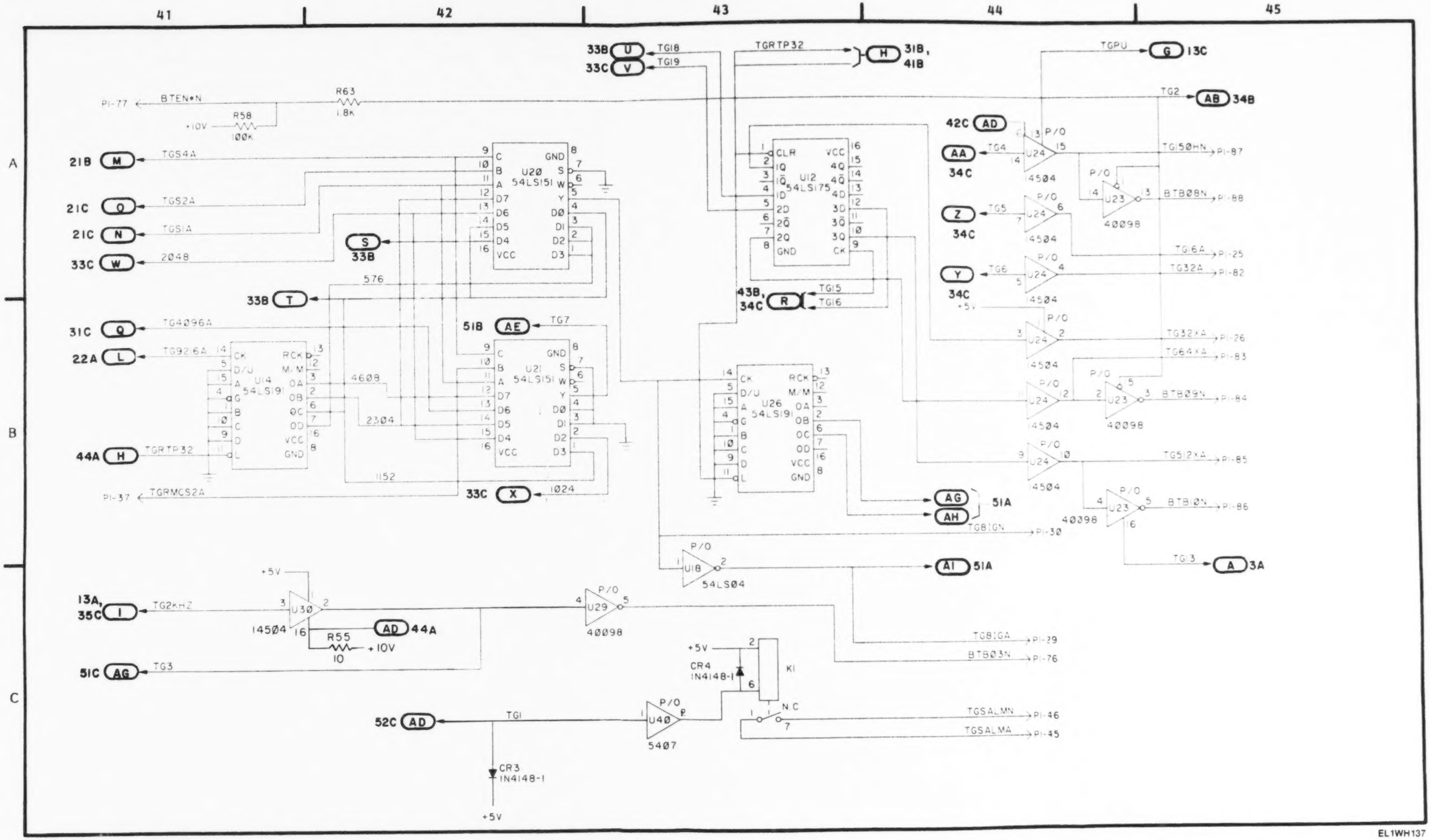

41
42
43
44
45
A
B
C
P1-77
BTEN•N
R63
1.8K
R58
100K
+10V
21B M TGS4A
21C O TGS2A
21C N TGS1A
33C W 2048
S 33B
33B T 576
U20 54LS151
C B A D7 D6 D5 D4 VCC GND S W Y D0 D1 D2 D3
31C Q TG4096A
22A L TG9216A
44A H TGRTP32
U14 54LS191
CK D/U A G B C D L RCK M/M OA OB OC OD VCC GND
4608
2304
1152
P1-37 TGRMCS2A
51B AE TG7
U21 54LS151
33C X 1024
33B U TG18
33C V TG19
TGRTP32
H 31B, 41B
U12 54LS175
CLR 1Q 1Q̄ 1D 2D 2Q̄ 2Q GND VCC 4Q 4Q̄ 4D 3D 3Q̄ 3Q CK
43B, 34C R TG15 TG16
U26 54LS191
AG AH 51A
TG8IGN P1-30
P/O U18 54LS04
AI 51A
TGPU G 13C
TG2 AB 34B
42C AD
AA 34C TG4
U24 14504
TG150HN P1-87
P/O U23 40098
BTB08N P1-88
Z 34C TG5
Y 34C TG6
TG16A P1-25
TG32A P1-82
+5V
TG32XA P1-26
TG64XA P1-83
BTB09N P1-84
TG512XA P1-85
BTB10N P1-86
TG13 A 3A
13A, 35C I TG2KHZ
+5V
U30 14504
AD 44A
R55 10 +10V
51C AG TG3
P/O U29 40098
TG8IGA P1-29
BTB03N P1-76
+5V
CR4 1N4148-1
K1
N.C
52C AD TG1
P/O U40 5407
TGSALMN P1-46
TGSALMA P1-45
CR3 1N4148-1
+5V

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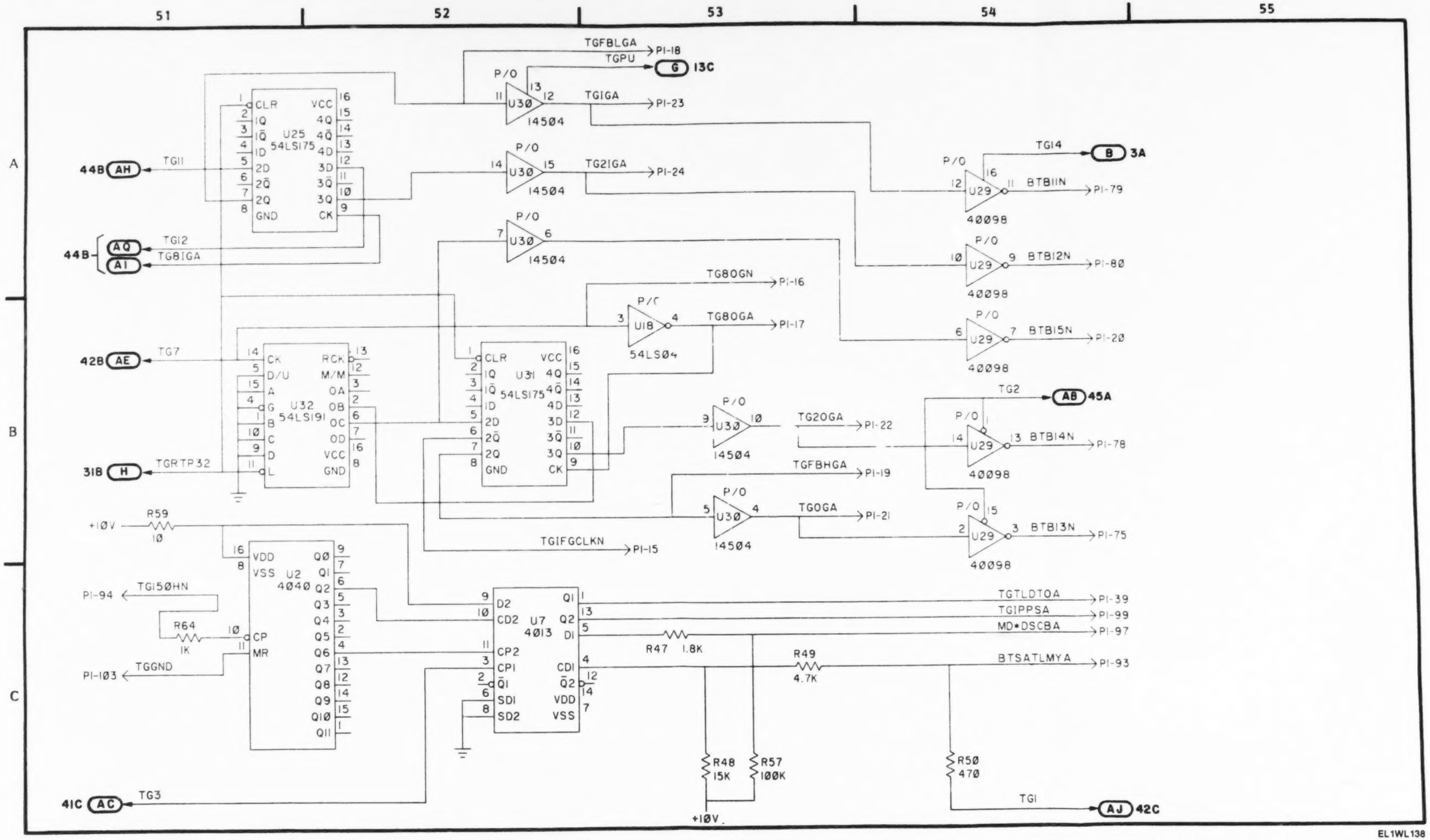
Figure FO-26. Timing Generator CCA A15 Schematic Diagram (Sheet 5 of 6)


51
52
53
54
55
A
B
C
TGFBLGA
P1-18
TGPU
G
13C
P/O
U30
14504
TG1GA
P1-23
TG21GA
P1-24
TG14
B
3A
BTB11N
P1-79
U29
40098
BTB12N
P1-80
BTB15N
P1-20
TG80GN
P1-16
U18
54LS04
TG80GA
P1-17
TG2
AB
45A
TG20GA
P1-22
BTB14N
P1-78
TGFBHGA
P1-19
TG0GA
P1-21
BTB13N
P1-75
TG1FGCLKN
P1-15
44B
AH
TG11
U25
54LS175
CLR
VCC
1Q
4Q
2D
3D
2Q
3Q
GND
CK
44B
AQ
AI
TG12
TG81GA
42B
AE
TG7
U32
54LS191
CK
RCK
D/U
M/M
QA
QB
QC
QD
VCC
GND
31B
H
TGRTP32
U31
54LS175
+10V
R59
10
U2
4040
VDD
VSS
CP
MR
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
P1-94
TG150HN
R64
1K
P1-103
TGGND
U7
4013
D2
CD2
CP2
CP1
Q1
SD1
SD2
Q2
D1
CD1
VDD
VSS
TGTLDTOA
P1-39
TGIPPSA
P1-99
MD•DSCBA
P1-97
R47
1.8K
R49
4.7K
BTSATLMYA
P1-93
R48
15K
R57
100K
+10V
R50
470
TG1
AJ
42C
41C
AC
TG3

EL1WL138

Figure FO-26. Timing Generator CCA A15
Schematic Diagram
(Sheet 6 of 6)